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MANUAL AND ATLAS OF DISSECTION

YUTZY

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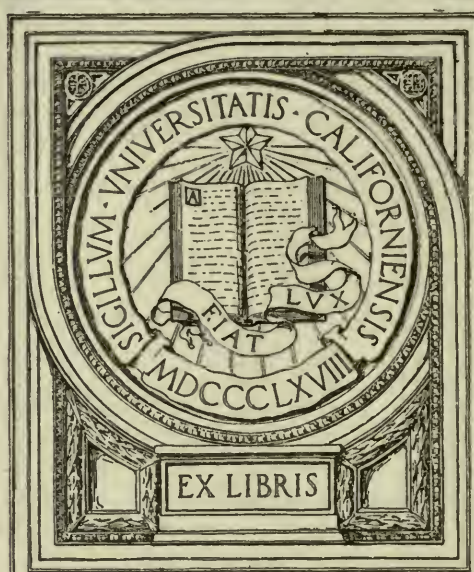

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A MANUAL AND ATLAS

OF

DISSECTION

BY

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INSTRUCTOR IN OSTEOLOGY AND DEMONSTRATOR OF ANATOMY IN THE UNIVERSITY OF MICHIGAN

With 314 Illustrations

WITH AN INTRODUCTION

BY

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PHILADELPHIA

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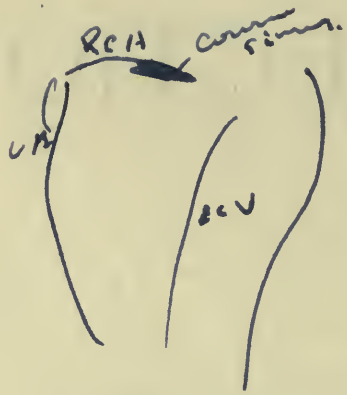

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PREFACE

The objects of this outline are to direct the student in his work in dissection, and to give a method of isolating the various structures with system and order. The work is divided into demonstrations. This means that a certain region, or regions called a demonstration, is to be dissected out and carefully studied by the student, and then the dissection inspected by a quiz master, the student quizzed and made to demonstrate the structures before going on to the dissection of another region.

The figures in this outline are principally taken from Morris' and Holden's "Anatomy," and will serve to give valuable suggestions.

8723

INTRODUCTION

For students attempting to use in connection with their laboratory work any of the popular text-books of Descriptive Anatomy, some sort of guide is necessary. There is always a danger that such a guide may become to the student the sole source of his information, which may thereby become superficial and imperfect. This difficulty may be avoided in two ways: either by making the guide so comprehensive that it becomes a text-book of Topographic Anatomy, or by reducing it to the status of a topographical index.

In the present volume the latter plan has been adopted. The student obtains from it only a list of the structures which he should find and study during his dissection of any part of the body, together with some concise directions as to how he should proceed with his dissection; for a description of the structures he must necessarily turn to his text-book. The dangers of the quiz-compend are thus avoided; indeed, the guide may serve as an excellent quiz-master in supplying the student with topics concerning whose relations he may test his knowledge. The numerous illustrations will but serve to increase the efficiency of the volume in both these respects.

The long experience of my colleague, Dr. Yutzy, as a successful teacher of Anatomy is a guarantee for the carefulness and thoroughness with which the book has been planned, and the satisfactory results which have followed the use of similar guides in the Anatomical Laboratory of the University of Michigan awaken the hope that it may prove equally satisfactory in a larger field.

J. Playfair McMurrich.

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PART I

HEAD, NECK, THORAX, THORACIC VISCERA, AND UPPER EXTREMITIES

GENERAL REMARKS TO THE STUDENT

It will add much to the comfort of all in the dissecting-room if each student sees that his material, table, and floor about the table are kept clean.

Do no cutting before you have familiarized yourself with the region upon which you are working. Read the descriptive anatomy in your text-books and examine the figures of the parts about to be dissected. Identify the landmarks and the relations they bear in position to the deeper structures.

Then carefully work out each structure, studying each part fully as it is exposed, noting its appearance and position in relation to other parts.

Clean muscles, noting their form, origin, insertion, action, and innervation. Remove the tissue from blood-vessels and nerves, and trace their branches as far as possible.

When a region is fully dissected out review frequently and carefully the dissection on the cadaver, observing each part in its proper position and its relation to surrounding parts. Learn to observe intelligently what you see. Observation, examination, and analysis are important qualities to the successful study and practice of medicine, and the earlier the habit of accuracy in these qualities is formed, the greater the success.

Each student should make a drawing of his dissection.

MANUAL AND ATLAS OF DISSECTION.

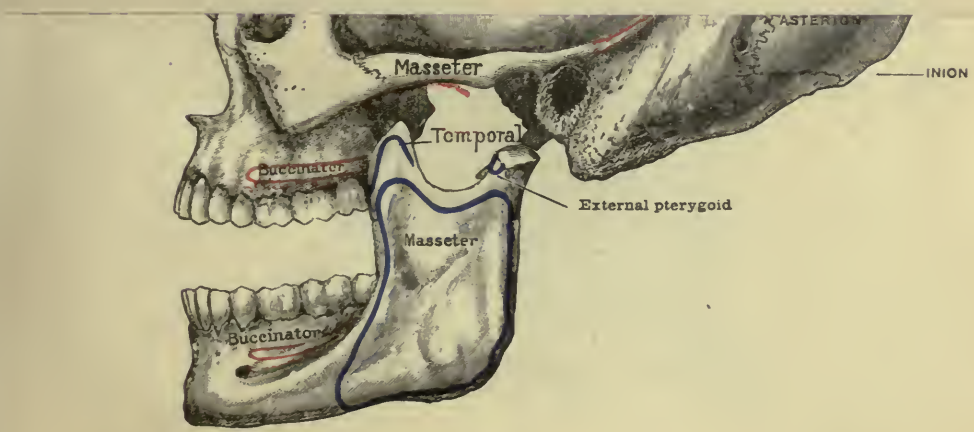
DEMONSTRATION I.

CRANIAL REGION

Shave the head.

Surface anatomy:—

Identify the following bony landmarks:—Nasion, glabella, inion,



bregma, lambda, frontal eminence, parietal eminence, zygomatic arch, temporal ridge, supra-orbital arch, supra-orbital notch or foramen.

GENERAL REMARKS TO THE STUDENT

It will add much to the comfort of all in the dissecting-room if each student sees that his material, table, and floor about the table are kept clean.

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ERRATA.

Page 48, under muscles of tongue, read "Extrinsic. (See Fig. 55)" instead of Fig. 60.

Page 48, under muscles of tongue, read "Intrinsic. (See Fig. 55)" instead of Fig. 60.

Page 69, twelfth line from bottom, read "Figs. 95, 99, 100" instead of Figs. 94, 98, 100.

to the successful study and practice of medicine, and the earlier the habit of accuracy in these qualities is formed, the greater the success.

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MANUAL AND ATLAS OF DISSECTION.

DEMONSTRATION I.

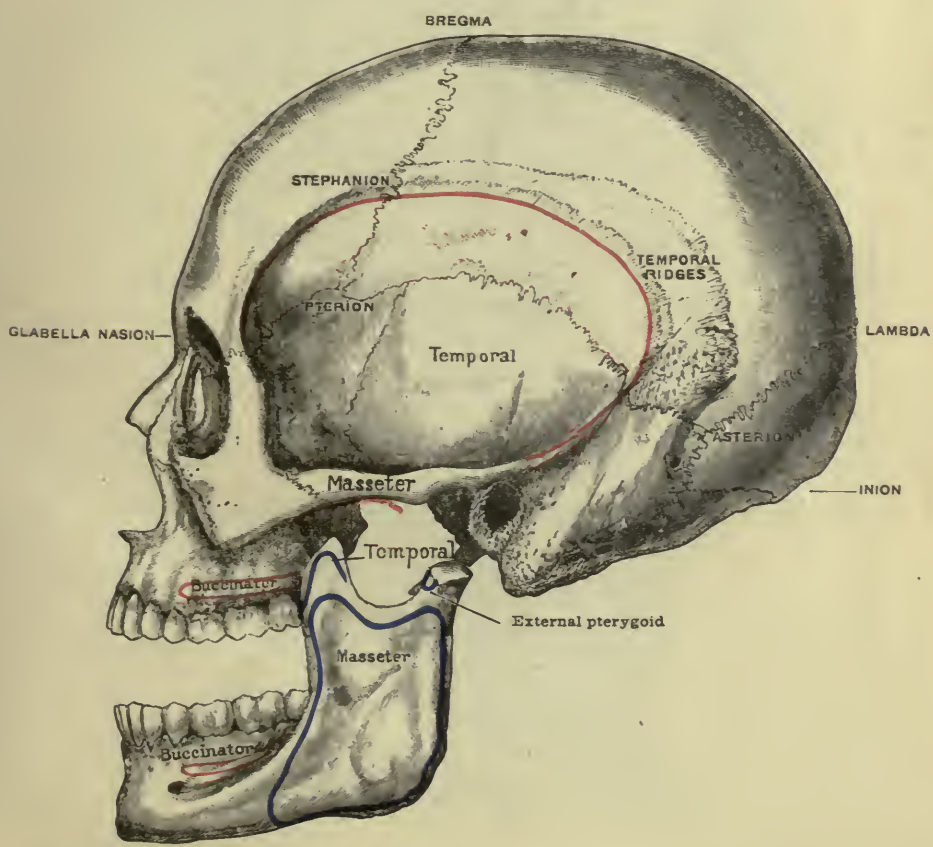
CRANIAL REGION

Shave the head.

Surface anatomy:—

Identify the following bony landmarks:—Nasion, glabella, inion,

FIG. 1.—THE SKULL.—(*Morris.*)

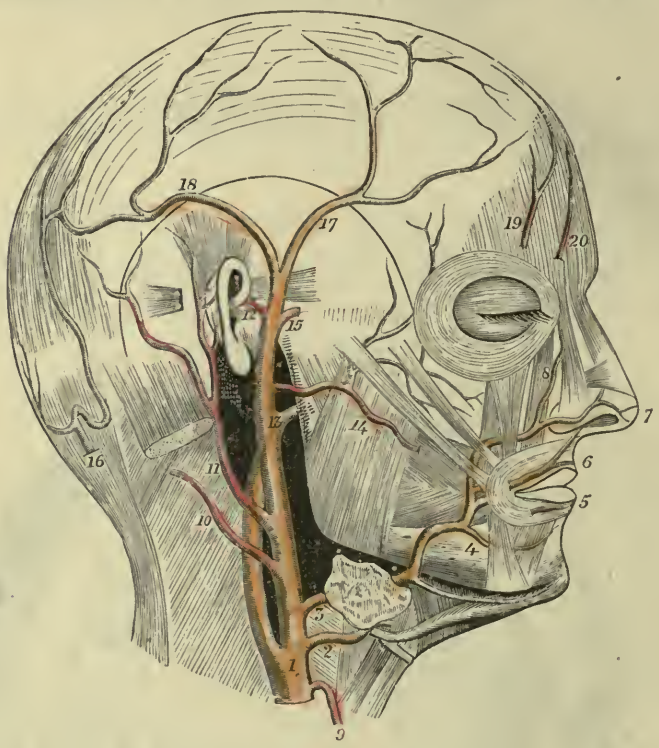


bregma, lambda, frontal eminence, parietal eminence, zygomatic arch, temporal ridge, supra-orbital arch, supra-orbital notch or foramen.

With coloured pencil or crayon outline the arteries of the head and face. Also outline veins of head and neck. (See Fig. 5.)

FIG. 2.—BRANCHES OF THE EXTERNAL CAROTID ARTERY.—(*Holden.*)

1. External carotid. 2. Lingual. 3. Facial. 4. Inferior labial. 5. Inferior coronary. 6. Superior coronary. 7. Lateral nasal. 8. Angular. 9. Superior thyroid. 10 and 16. Occipital. 11. Posterior auricular. 12. Anterior auricular. 13. Internal maxillary. 14. Transverse facial. 15. Middle temporal. 17. Anterior temporal. 18. Posterior temporal. 19. Supra-orbital. 20. Frontal.



Also outline superficial nerves of head and neck. (See Figs. 3 and 4.)

Describe muscle, tendon, aponeurosis, superficial and deep fasciæ.

DEMONSTRATION II.

Dissection.—*Make a vertical incision through the skin only, from the root of the nose to the external occipital protuberance. Make a second incision horizontally along the forehead and around the side of the head, from the anterior to the posterior extremity of the first incision.*

Remove the skin with great care so as not to remove the blood-vessels and nerves lying in the superficial fascia.

Study the skin of the scalp.

Study the fascia of the scalp.

Dissect out and study the following nerves and blood-vessels:—

Nerves (see Figs. 3 and 4):—

Frontal.
Supra-orbital.
Supratrochlear.
Auriculo-temporal.
Orbital or temporo-malar.
Temporal branch of seventh.
Occipitalis major.
Occipitalis minor.

FIG. 3.—(*Holden.*)

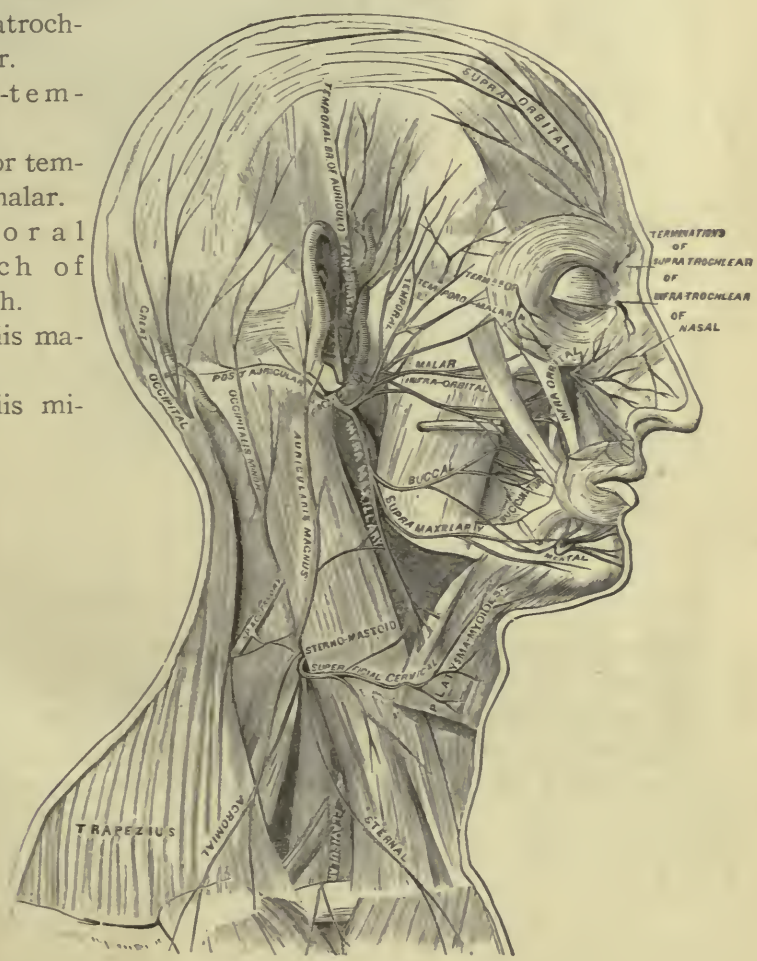
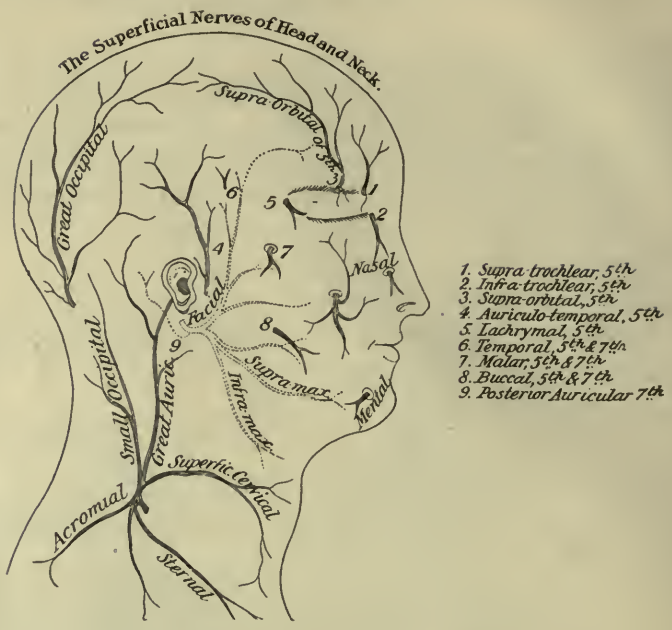


FIG. 4.—CRANIAL NERVES.—(*Potter.*)



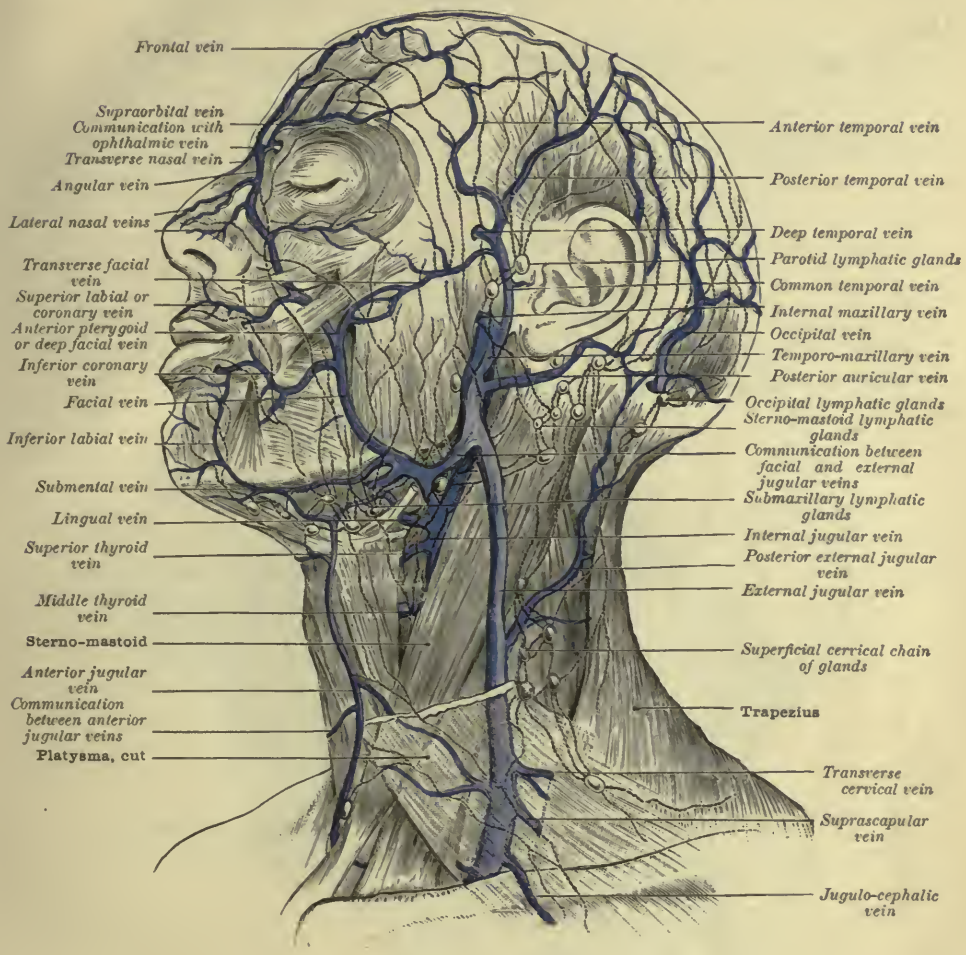
Arteries (see Fig. 2):—
- Supra-orbital.
- Frontal.
- Superficial temporal.
- Posterior auricular.
- Occipital.

Veins (see Fig. 5):—
- Supra-orbital.
- Frontal.
- Temporal.
- Posterior auricular.
- Occipital.

Study lymphatics of head and face. Some of the larger lymphatic nodes can be dissected out. The smaller nodes and lymphatic vessels cannot be seen in dissection, and the student must be satisfied with studying the text and figures in books.

Expose and study **occipito-frontalis muscle** (*M. epicranius*). (See Fig. 7.)

FIG. 5.—THE SUPERFICIAL LYMPHATICS AND VEINS OF THE SCALP, FACE, AND NECK.—(*Morris.*)



AURICULAR REGION

Carefully remove the skin from about the auricle and expose the extrinsic muscles of the auricle:—

Attrahens aurem (*M. auricularis anterior*). (See Fig. 7.)

Attollens aurem (*M. auricularis superior*).

Retrahens aurem (*M. auricularis posterior*).

Draw the auricle in a direction from the point of origin of the muscle; this will make the muscle-fibres prominent and the muscle can be exposed.

Expose the following nerves and blood-vessels:—

Nerves (see Fig. 3):—

Posterior auricular.

Auricular branch of auricularis magnus.

Arteries (see Fig. 2):—

Posterior auricular.

DEMONSTRATION III.

FACE

EXTERNAL PALPEBRAL AND ORBITAL REGIONS

General surface view.

Appendages of the eye.

Eyebrows.

Eyelids.

Outer and inner canthus.

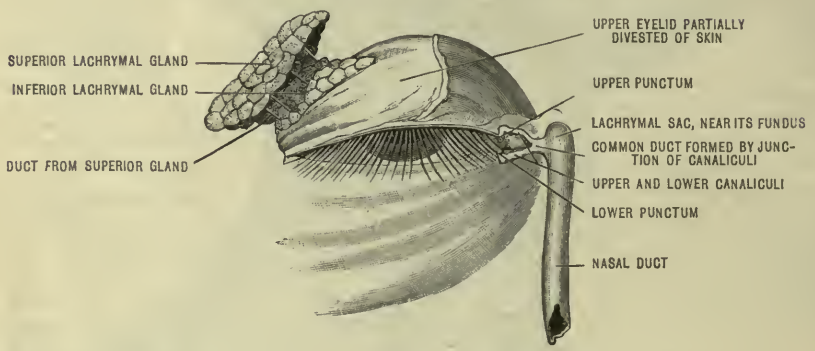
Eyelashes.

Tarsal plates.

Study and trace the conjunctiva.

Observe caruncula lachrymalis.

FIG. 6.—LACHRYMAL APPARATUS.—(*Morris.*)



Lachrymal apparatus:—

Lachrymal gland.

Puncta lachrymalia.

Lachrymal canal.

Lachrymal sac.

Nasal duct.

Pass a probe into the puncta lachrymalia and out the lachrymal canal into the lachrymal sac. Slit open the inferior lachrymal canal to the sac and then pass a probe down the nasal duct.

Make an incision through the skin encircling the anterior border of the orbit; remove the skin over the eyelids to their edges and expose:—

Muscles:—

Orbicularis palpebrarum (*M. orbicularis oculi*). (Fig. 7.)

Tensor tarsi.

Tendo oculi.

Corrugator supercilii. (Fig. 7.)

Levator palpebræ superioris.

Nerves (see Figs. 3 and 4):—

Supra-orbital.

Supratrochlear.

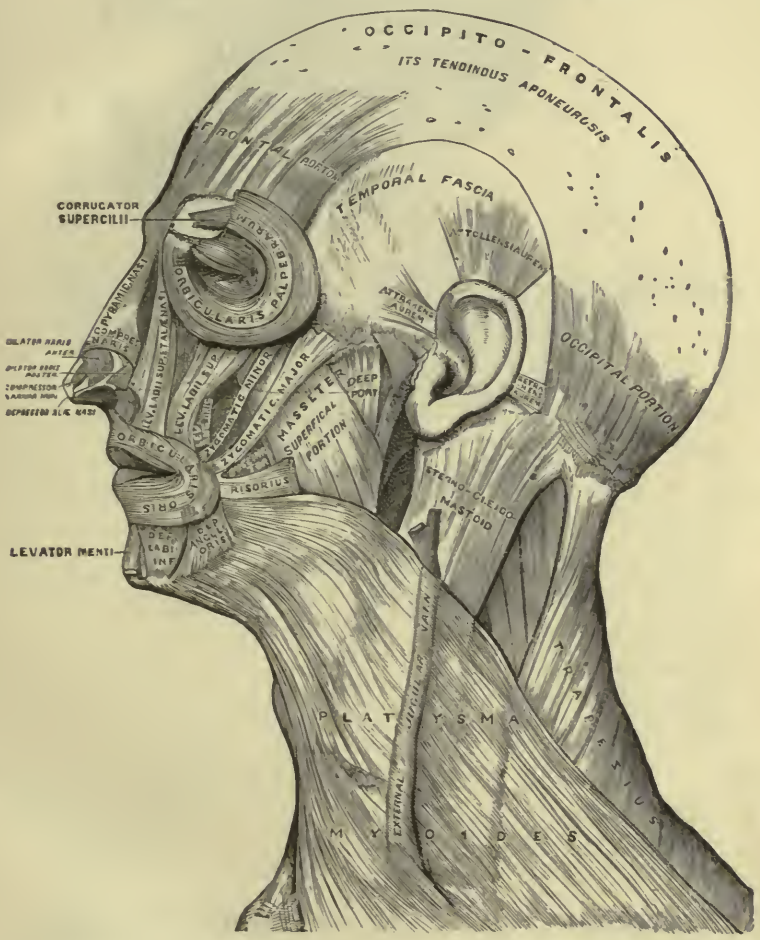
Infratrochlear.

Arteries (see Fig. 2):—

Supra-orbital.
Frontal.
Nasal.
Palpebral.
Lachrymal.

Observe the Meibomian glands in the tarsal plates by holding the eyelids between you and the light. (Fig. 8.)

FIG. 7.—(*Holden.*)

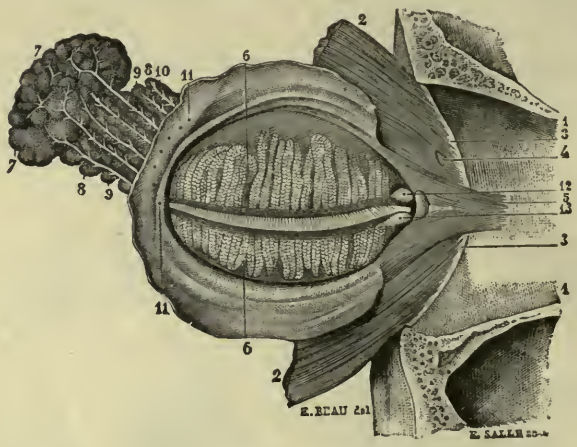


Expose the tendons of the muscles inserted into the sclerotic coat of the eye by cutting through conjunctiva between the eyelids and eyeball. To keep the insertion of the tendons in view place a splinter under each.

Moderately distend the cheek with tow and stitch the lips together. Make a longitudinal incision through the skin down the median line of the face to the upper lip, then carry an incision along the margin of the lip and transversely across the face to the angle of the jaw. Turn the skin outwards.

FIG. 8.—TENSOR TARSI ATTACHMENT OF THE ORBICULARIS PALPEBRARUM TO THE INNER PART OF THE BASE OF THE ORBIT.—(*Holden.*)

1, 1. Inner wall of the orbit. 2, 2. Internal part of the orbicularis palpebrarum. 3, 3. Attachment of this muscle to the circumference of the base of the orbit. 4. Opening for the nasal artery. 5. Tensor tarsi. 6, 6. Posterior view of the lids. 7, 7. Orbital portion of the lachrymal gland. 8, 9, 10. Palpebral portion of this gland. 11, 11. Mouths of its excretory ducts.



NASAL REGION

Expose the following structures:—

Arteries (see Fig. 2):—

Lateralis nasi.
Angular.

Muscles (see Fig. 7):—

Pyramidalis nasi.
Levator labii superioris alæque nasi.
Dilator naris posterior.
Dilator naris anterior.
Compressor nasi.
Compressor narium minor.
Depressor alæ nasi.

Nerves:—

Nasal branch of ophthalmic.
Nasal branch of infra-orbital.

SUPERIOR, INFERIOR, AND INTER-MAXILLARY REGION

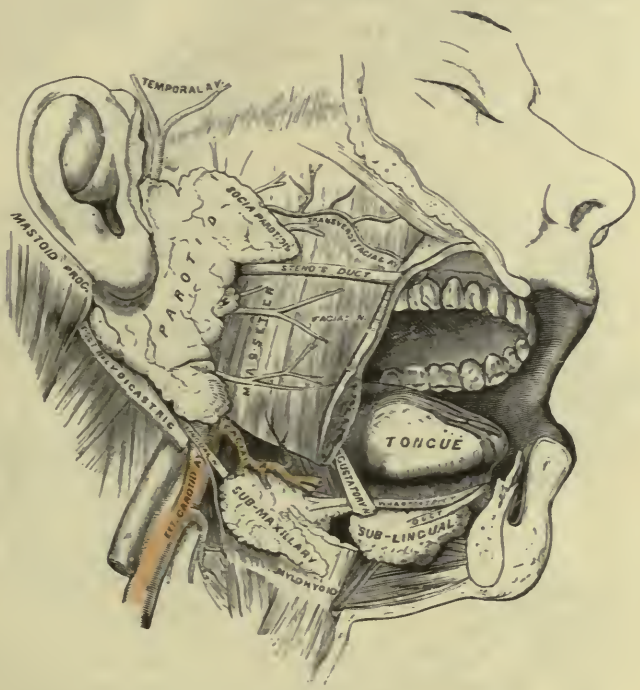
Make an incision along the margin of the lower lip and turn the skin down to the lower border of the mandible.

Study the parotid fascia. Carefully expose the surface of the parotid gland. Exercise great care in this region so as not to cut any branches of the facial nerve.

Study the parotid gland. (Fig. 9.)

Expose the facial nerve by first finding the infra-orbital branch. This lies below the zygomatic arch and close to the parotid duct. Trace the nerve forwards under the levator labii superioris muscle, and expose the infra-orbital plexus. At the same time trace forwards the parotid duct to where it pierces the buccinator muscles. Now trace the infra-orbital branch back into the parotid gland, carefully looking for the other branches of facial nerve. (See Fig. 3.)

FIG. 9.—(*Holden.*)



Branches of the facial nerve on the face (Fig. 3):—

- Temporo-facial.
  - Temporal.
  - Malar.
  - Infra-orbital.
- Cervico-facial.
  - Buccal.
  - Supra-maxillary.
  - Infra-maxillary.

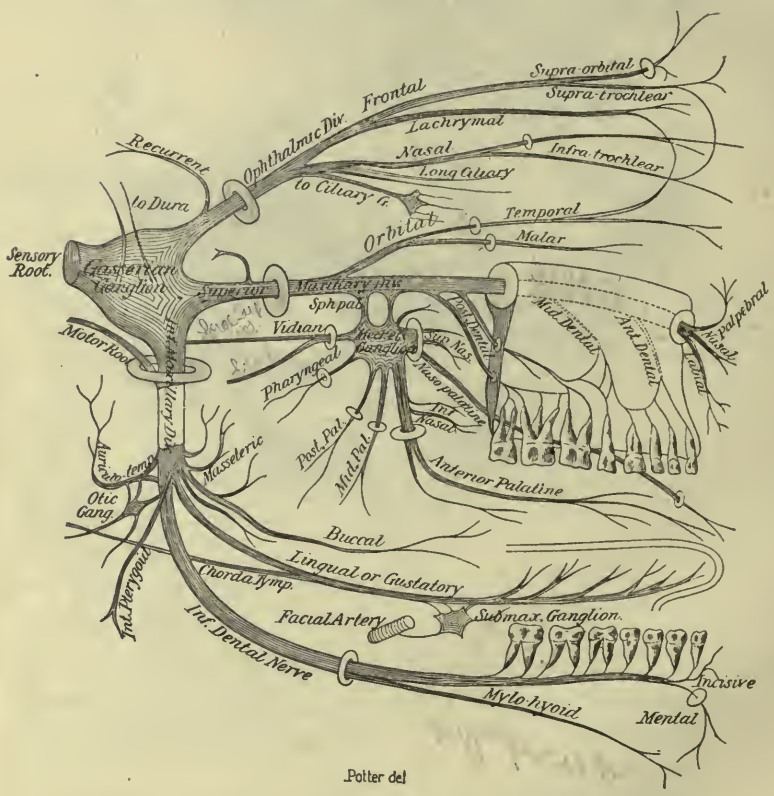
Auricularis magnus nerve of cervical plexus.

Muscles (see Fig. 7):—

- Platysma myoides.
- Superior maxillary region.
  - Levator labii superioris.

Levator anguli oris.
Zygomaticus major.
Zygomaticus minor.
Intermaxillary region.
Orbicularis oris.
Buccinator.
Risorius.
Inferior maxillary region.
Levator labii inferioris.
Depressor labii inferioris.
Depressor anguli oris.

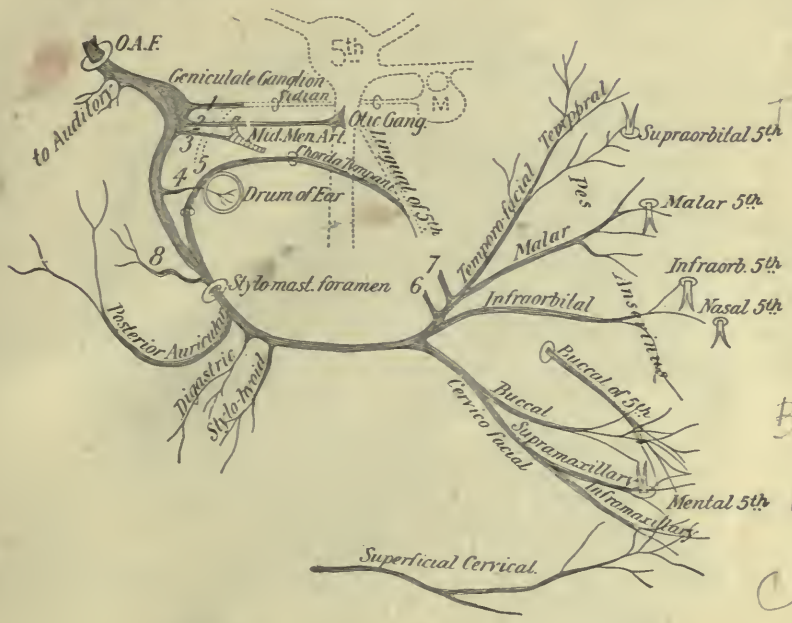
FIG. 10.—THE CRANIAL NERVES. FIFTH NERVE—TRIGEMINUS.—(*Potter.*)



Branches of fifth nerve on face (see Fig. 4):—
Infra-orbital.
Palpebral.
Nasal.
Labial.
Malar.
Auriculo-temporal.
Mental.
Study the whole of fifth or trifacial nerve at this time. (Fig. 10.)

Study the whole of facial nerve at this time.

FIG. 11.—THE CRANIAL NERVES. SEVENTH NERVE—FACIAL OR PORTIO DURA.—(*Potter.*)



References.

1. Large Superf. Petrosal, to form Vidian with No5
2. Small Superf. Petrosal, to otic Ganglion.
3. External Superf. Petrosal, to Plexus on Mid. Meningeal Artery
4. Tympanic Br. to Stapedius, etc
5. Br. from Carotid Plexus, Making Vidian, with No1.
6. 7. Brs. to Auriculo-Temporal of 5th
8. Br. to Auricular of Vagus

M. The Ganglion of Meckel
O. A. F. Orifice of Aquæductus Fallopii

Potter, del.

Arteries on the face (see Fig. 2):—

Facial and branches (*A. maxillaris externa*).
Transverse facial.
Middle temporal.
Orbital (*A. zygomatico-orbitalis*).
Infra-orbital.
Mental.

Veins on face (see Fig. 5):—

Frontal.
Supra-orbital.
Angular.
Facial and branches.
Temporal.
Internal maxillary.
Temporo-maxillary.
Posterior auricular.

Lymphatics (see Fig. 5):—

Study lymphatics of head, face, and neck

DEMONSTRATION IV.

SKULL

Study the external surfaces of the superior, posterior, lateral, and anterior regions of the skull.

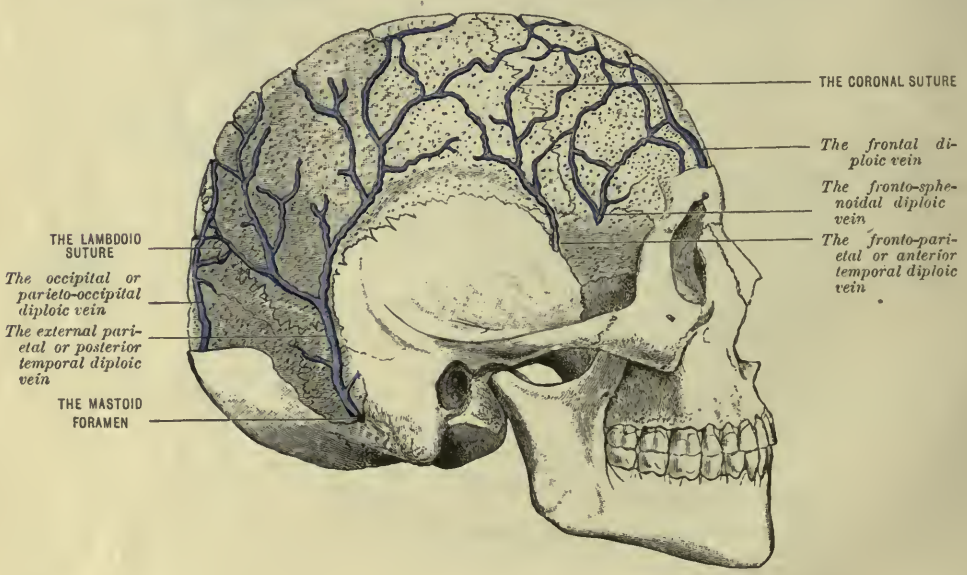
Remove the skull-cap by making a circular incision with the saw, commencing in front about one inch above the margin of the orbit, and extending behind a little above the external occipital protuberance. Saw through the bone only, and with chisel and hammer break the skull-cap loose with care so as not to break the investing membranes of the brain.

Observe the interior of skull-cap. Note groove for middle meningeal artery.

Examine diploë by chiseling away part of the outer plate of skull-cap.

Study veins of diploë.

FIG. 12.—THE VEINS OF THE DIPLOË.—(*Morris.*)
(From a specimen in St. Bartholomew's Hospital Museum.)


THE CORONAL SUTURE
The frontal diploic vein
The fronto-sphenoidal diploic vein
The fronto-parietal or anterior temporal diploic vein
THE LAMBDOID SUTURE
The occipital or parieto-occipital diploic vein
The external parietal or posterior temporal diploic vein
THE MASTOID FORAMEN

Observe middle meningeal artery. What is its origin and course?

Membranes of brain:—

Study dura mater.

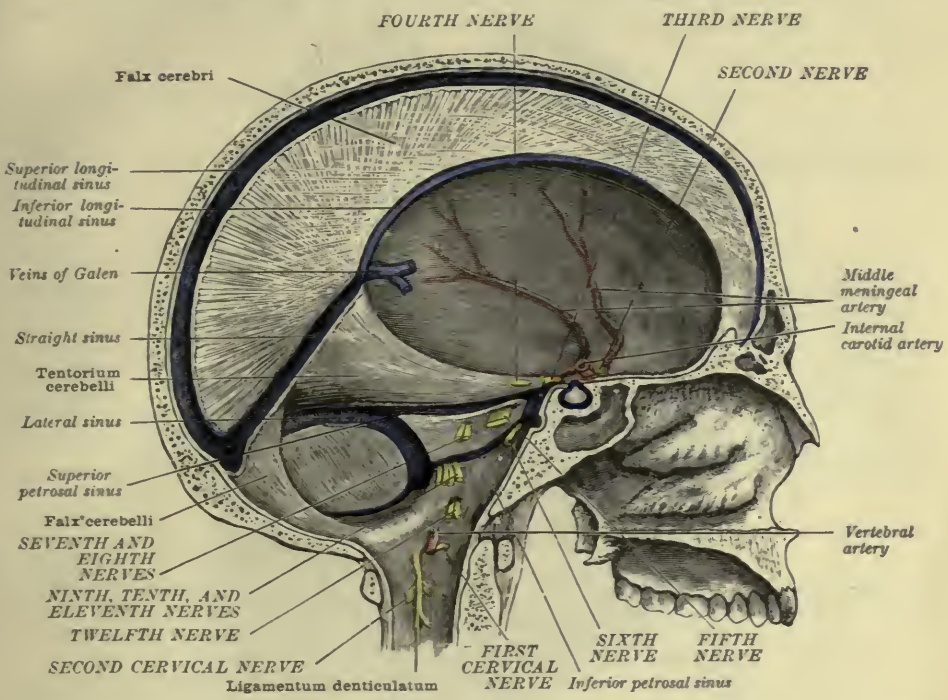
Make a puncture in median line of dura mater, insert a blow-pipe, and distend with air the superior longitudinal sinus. Then make an incision through the dura on one side of the superior longitudinal sinus and turn the dura outwards. Observe the falx cerebri and tentorium cerebelli. (Fig. 13.)

Study **superior longitudinal, inferior longitudinal,** and **straight sinuses.**

Study **arachnoid** and **pia mater.**

Observe the glandulæ Pacchioni.

FIG. 13.—THE VENOUS SINUSES. (Longitudinal section.)—(*Morris.*)



Remove the **brain.** *Lift the frontal lobes from the dura and turn the brain back. Observe the cranial nerves. Cut the nerves so that part is left on the base of cranium. Cut through the tentorium cerebelli along its attachment to the superior border of the petrous portion of temporal bone. Push the cerebellum to one side and observe the nerves as they leave the brain, cut the nerves, and then thrust a knife into the vertebral canal and divide the spinal cord.*

Study the arteries at the base of the brain (Fig. 14):—

Cerebral portion of internal carotid.

- Anterior cerebral.
- Middle cerebral.
- Posterior communicating.
- Anterior choroid.

Basilar and branches.

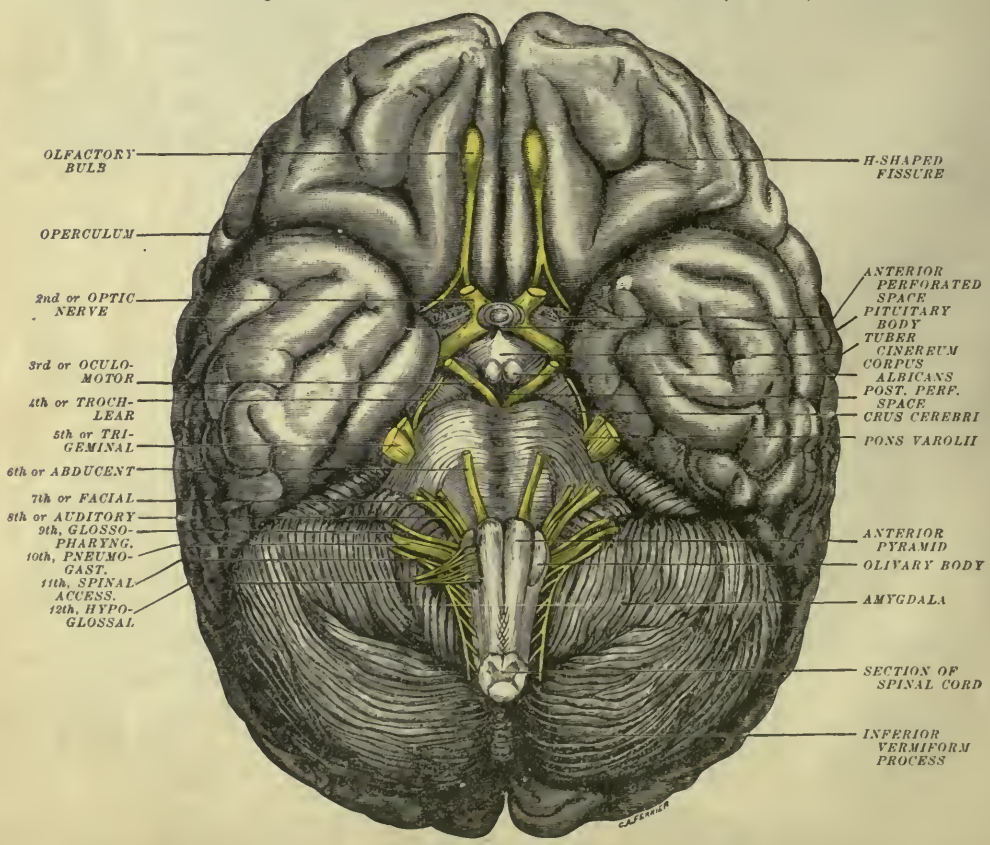
Circle of Willis (Fig. 14) (*Circulus arteriosus*) is formed by:—

- Anterior cerebral.
- Anterior communicating.
- Posterior cerebral.
- Posterior communicating.

FIG. 14.—THE ARTERIES OF THE BRAIN.—(*Morris.*)
(The posterior part of the cerebrum on the left side has been cut away to show the cerebellum. From a preparation in the Museum of St. Bartholomew's Hospital.)

Observe where the cranial nerves leave the brain.

FIG. 15.—VIEW OF THE BASE OF THE BRAIN.—(*Morris.*)

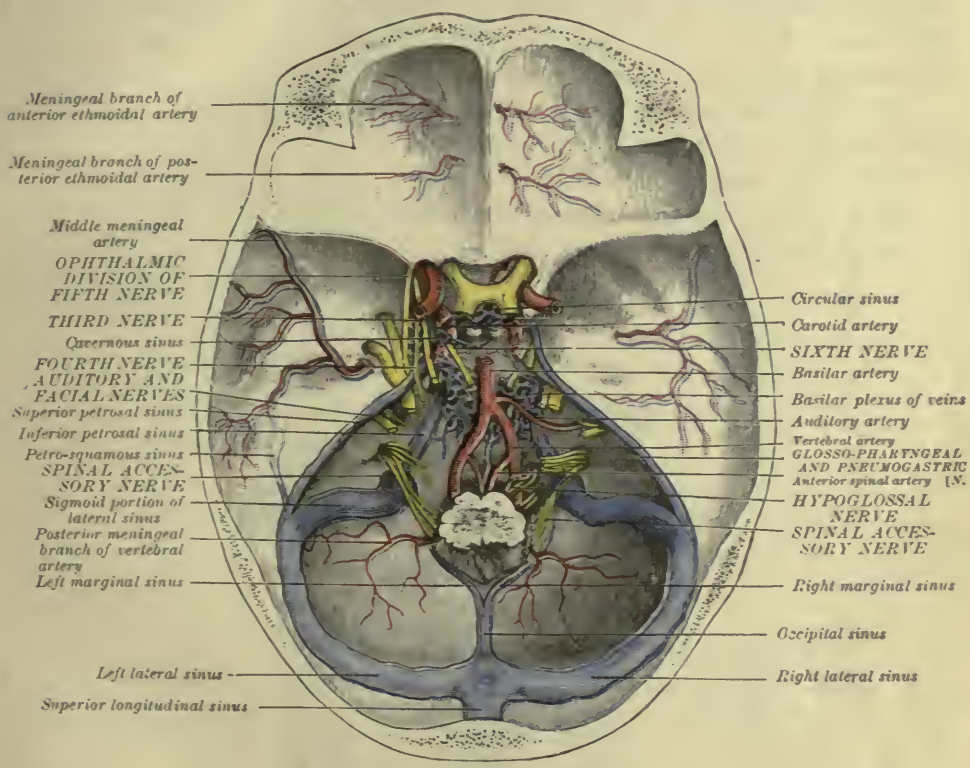


Place the brain, if in good condition, in alcohol or formalin for future use.

The central nervous system is so important and so extensive that a separate dissection is advisable, therefore the directions for the dissection of the brain and spinal cord are not given in this outline.

Now note the exit of the cranial nerves through the dura and base of cranium.

FIG. 16.—THE VENOUS SINUSES.—(*Morris.*)
(From a dissection by W. J. Walsham in St. Bartholomew's Hospital Museum.)



Expose the sinuses of the dura mater (see Figs. 13 and 16):—

The superior longitudinal, inferior longitudinal, and straight sinuses have been seen.

The remaining are:—

Lateral.	Circular.
Occipital.	Superior petrosal.
Cavernous.	Inferior petrosal.

Transverse.

Study:—Ophthalmic veins and emissary veins.

Name and locate the openings through the base of cranium in:—

Anterior cranial fossa.
Middle cranial fossa.
Posterior cranial fossa.

INTERNAL ORBITAL REGION

Remove the roof of the orbit by making one section with the saw on the outer angle and one on the inner angle of the orbit, so that the two sections converge at the optic foramen. Be careful not to injure the pulley at the inner angle for superior oblique muscle. Do not cut entirely through the bone with the saw, but with a hammer break the anterior part of orbit transversely and turn this forwards and downwards. Remove the rest of the roof with bone forceps back to the optic foramen. Now insert a blow-pipe into cranial end of optic nerve and distend the eyeball with air.

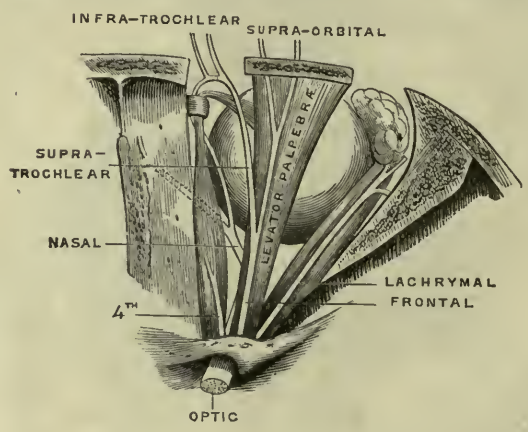
Study the periosteum of the orbit. Notice it is a continuation of the dura mater through the sphenoidal fissure.

Study the fascia of the orbit.

Next expose the following structures:—

Lachrymal gland. (Figs. 6 and 8.)

FIG. 17.—VIEW OF ORBIT FROM ABOVE.—(*Holden.*)



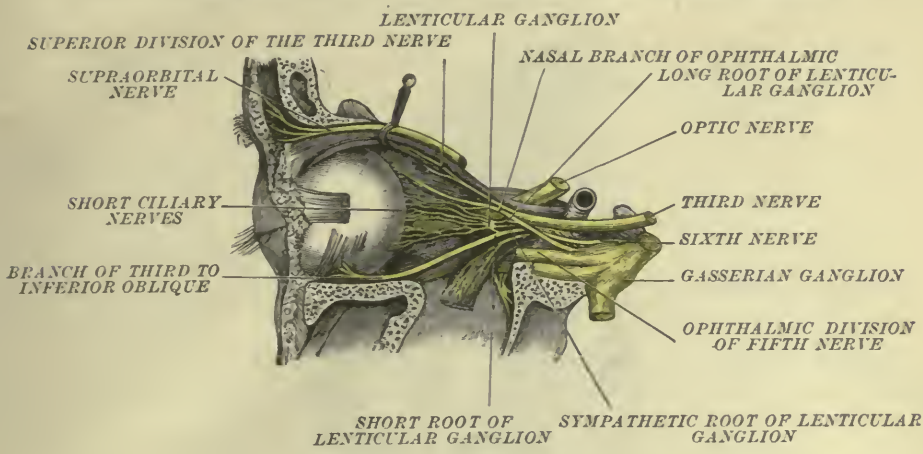
Nerves:—

Ophthalmic.
Frontal.
Lachrymal.
Nasal.

Ciliary ganglion.—(*This lies between the external rectus muscle and optic nerve in posterior third of orbit.*) (Fig. 18.)

Motor oculi.
Trochlear.
Abducens.
Orbital branch of superior maxillary.
Optic.

FIG. 18.—NERVES OF THE ORBIT, FROM THE OUTER SIDE.—(*Morris.*)



Arteries (see Fig. 19):—

Ophthalmic and branches.

Veins:—

Ophthalmic and tributaries.

Muscles (see Fig. 20):—

Levator palpebræ.
Rectus superior.
Rectus inferior.
Rectus externus.
Rectus internus.
Superior oblique.
Inferior oblique.

FIG. 19.—THE LEFT OPHTHALMIC ARTERY AND VEIN.—(*Morris.*)

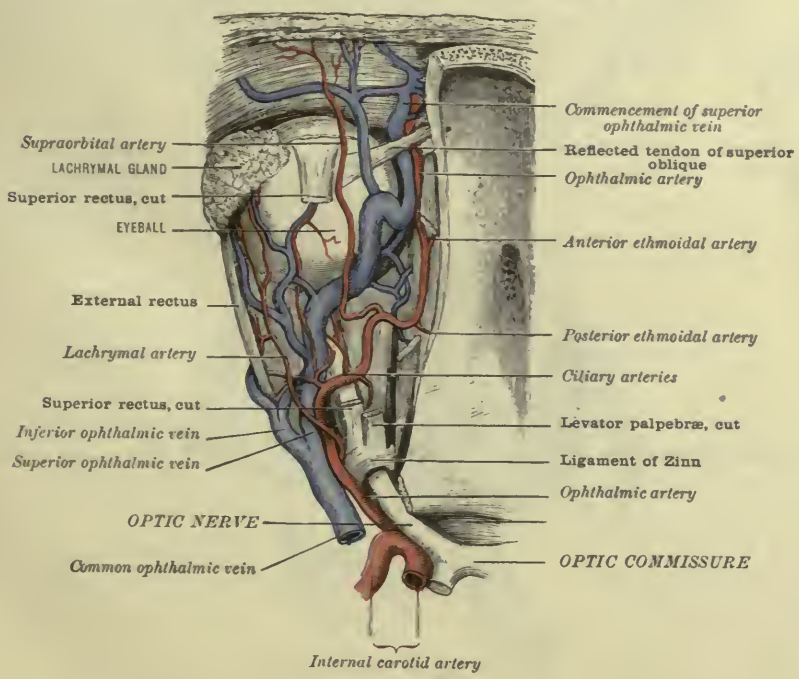
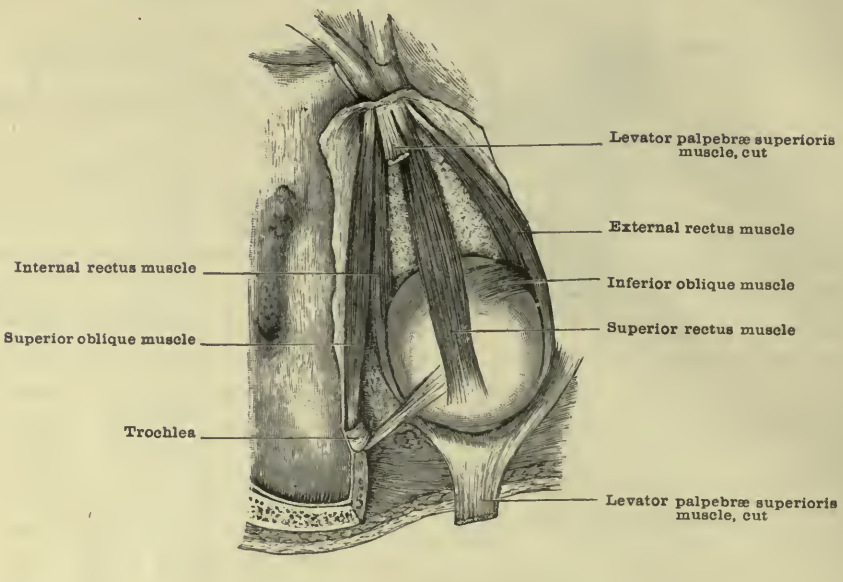


FIG. 20 (see also Fig. 18).—VIEW OF LEFT ORBIT FROM ABOVE, SHOWING THE OCULAR MUSCLES.—(*Morris.*)



THE EYE

Dissect the eye of an ox or sheep. Remove the muscles and fat about the eyeball.

Study the aqueous humor, sclerotic coat, and cornea. Then cut through the sclerotic coat just behind the cornea, nearly encircling the eye, and turn forwards the anterior part. Note the **iris** and **pupil.**

Float out the crystalline lens and vitreous in water. Study the lens and its capsule and vitreous. Then note and study choroid, ciliary processes, retina, anterior and posterior chambers.

FIG. 21.—SURFACE OF CHOROID AND IRIS EXPOSED BY REMOVAL OF SCLEROTIC AND CORNEA, SHOWING DISTRIBUTION OF BLOOD-VESSELS AND NERVES. (Twice natural size.)—(*Morris.*)

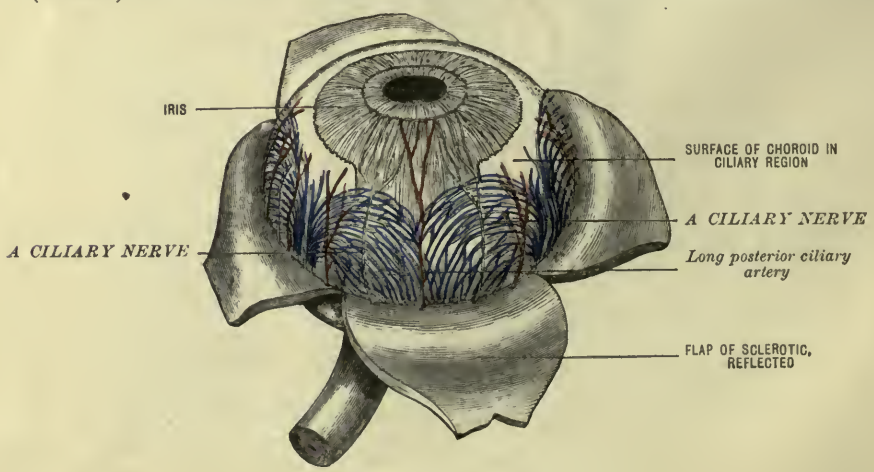
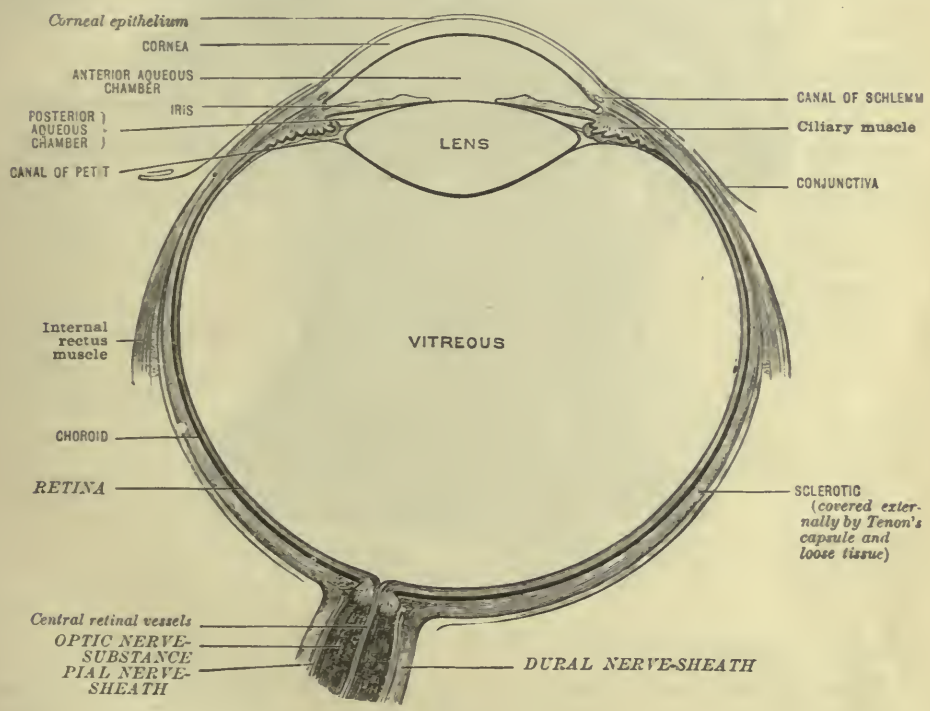


FIG. 22.—SEMI-DIAGRAMMATIC HORIZONTAL SECTION THROUGH EYEBALL AND OPTIC NERVE. —(*Morris.*)

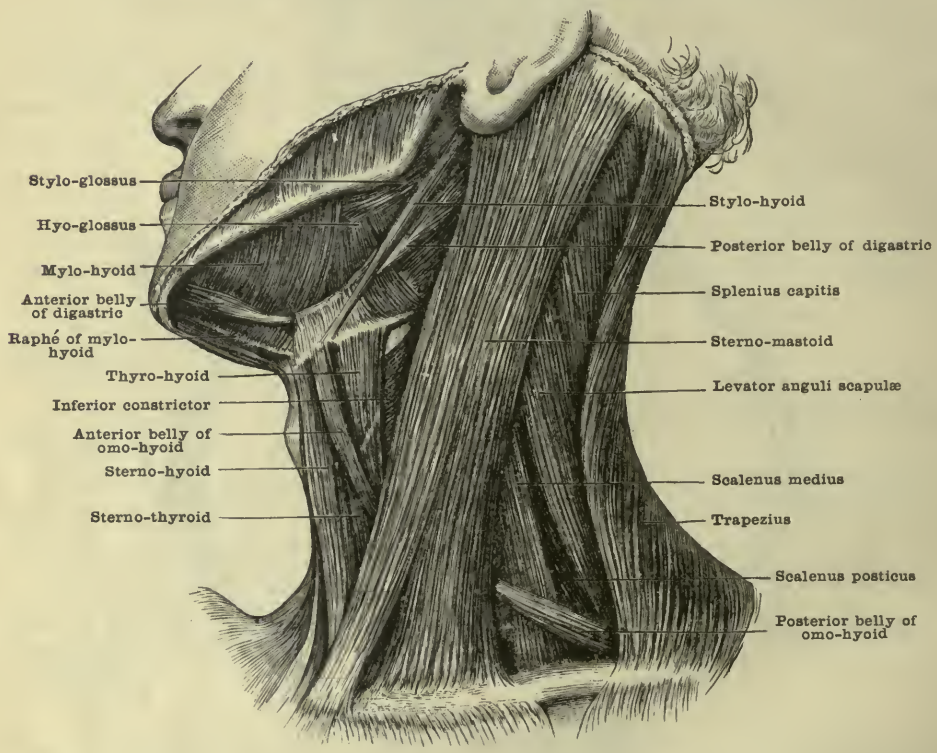


DEMONSTRATION V.

THE NECK

Place the body upon its back with a block under the upper part of the thorax; turn the face to one side. You will see that the side of the neck presents a quadrilateral figure, the boundaries of which are:—Anterior, middle line; posterior, anterior margin of trapezius muscle; superior, mandible; inferior, clavicle and manubrium.

FIG. 23.—ANTERIOR AND LATERAL CERVICAL MUSCLES.—(*Morris.*)



Surface anatomy:—

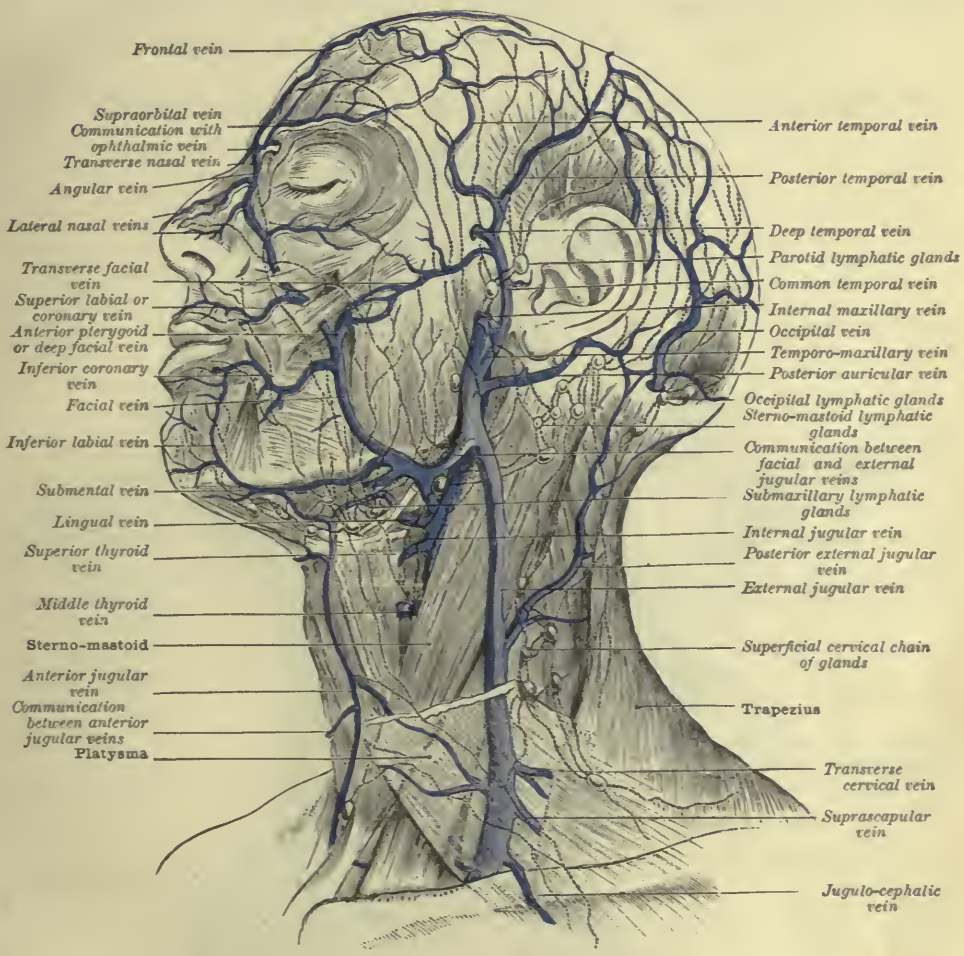
Outline sterno-mastoid muscle. This muscle divides the neck into an anterior or carotid and a posterior triangle. The omo-hyoid muscle divides the anterior triangle into a superior and inferior carotid triangle; and the posterior triangle into the subclavian and occipital. The submaxillary or digastric triangle is between the mandible and stylo-hyoid and digastric muscles.

Locate the hyoid bone, thyroid and cricoid cartilages, and trachea. As the trachea passes down from the cricoid cartilage it recedes so that there is a deep fossa—fonticulus gutturis—above the sternum.

Dissection:—Make a vertical incision through the skin down the middle of the neck from the symphysis of the mandible to the sternum, a second incision along the clavicle to the acromion process. Reflect the skin outwards to the anterior boundary of the trapezius muscle.

This will expose the superficial fascia and platysma myoides muscle. Study the **superficial cervical fascia.**

FIG. 24.—THE SUPERFICIAL VEINS AND LYMPHATICS OF THE SCALP, FACE, AND NECK. —(*Morris.*)



Superficial branches of cervical plexus. (See Fig. 25.)

- Transverse cervical.
- Supra-sternal.
- Supra-clavicular.
- Supra-acromial.
- Great auricular.
- Small occipital.

Spinal accessory.

Study the **platysma myoides.**

Carefully remove the platysma myoides and expose:—

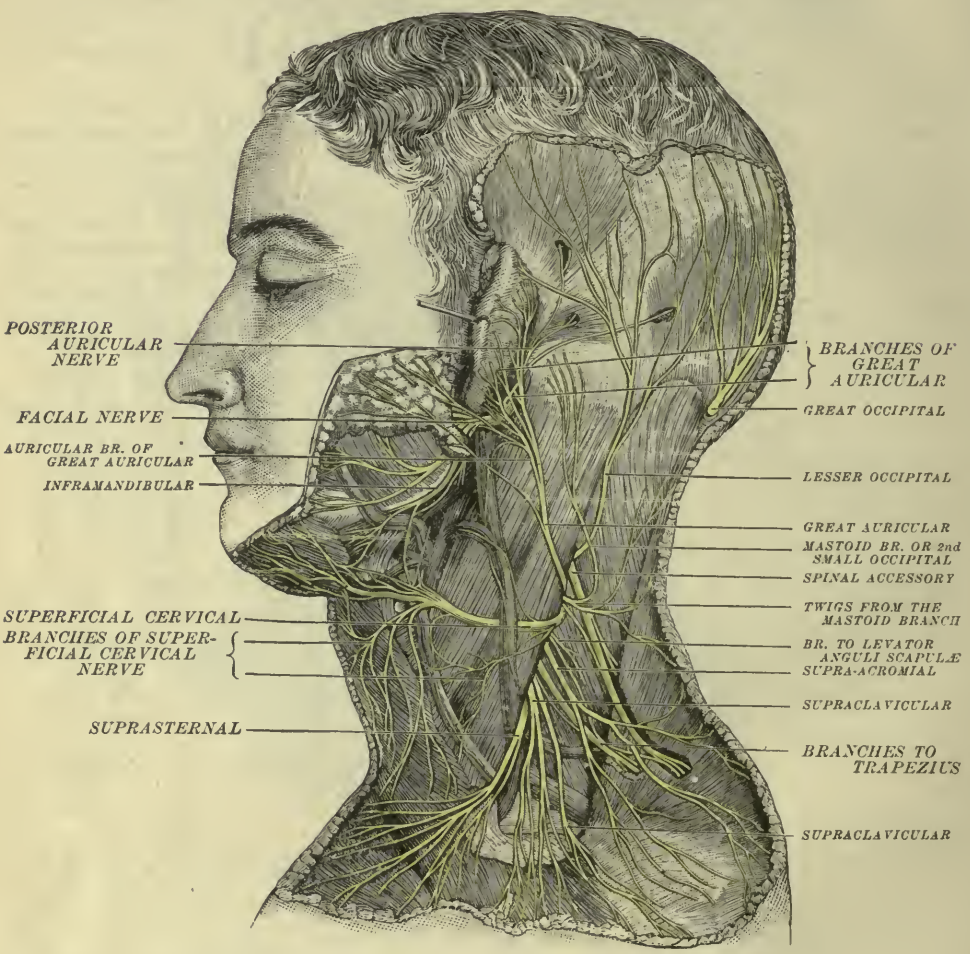
Superficial veins (Fig. 24):—

- External jugular.
- Anterior jugular.
- Posterior jugular.

Lymphatics of the neck. (Fig. 24.)

Superficial cervical.
External jugular.
Anterior cervical.
Submaxillary.
Submental.

FIG. 25.—SUPERFICIAL BRANCHES OF THE CERVICAL PLEXUS.—(*Morris.*)



Study deep cervical fascia.

Triangles of the neck :—

Anterior triangles.
Digastric or submaxillary.
Carotid superior or carotid.
Carotid inferior or muscular.
Posterior triangles.
Occipital.
Subclavian.

Complete the dissection of the posterior triangle before doing any further dissection on the anterior triangles.

In **posterior triangle** expose and study:—

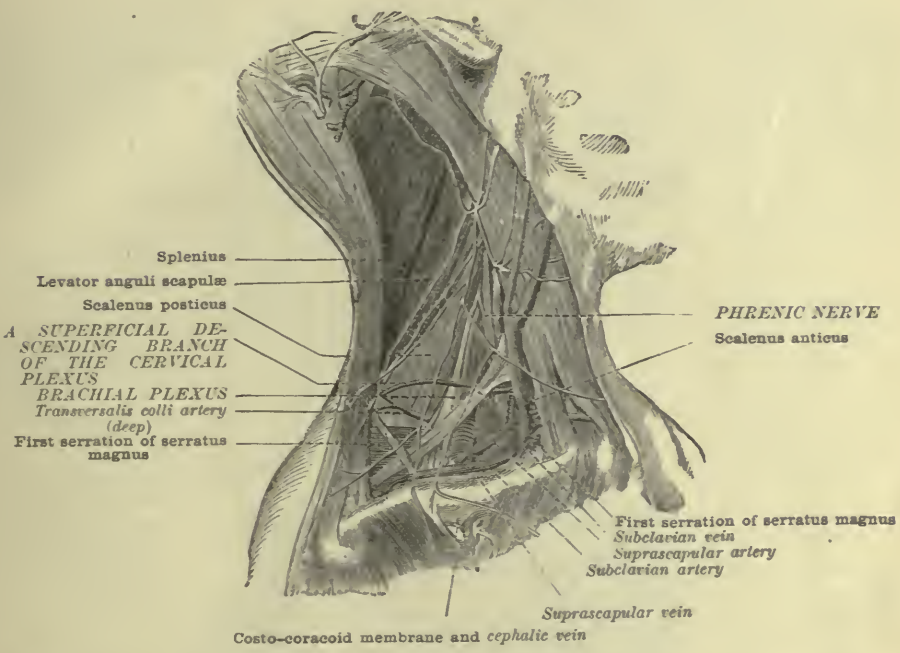
Arteries:—

Supra-scapular (*A. transversa scapulæ*).

Transverse cervical.

Expose third portion of **subclavian** artery by pushing aside scalenus anticus and medius muscles.

FIG. 26.—REGION OF THE THIRD PART OF THE SUBCLAVIAN ARTERY. (Bellamy.) (*Morris.*) Also see Fig. 28.
(The shoulder represented depressed.)



Nerves (see Figs. 25 and 28):—

Cervical plexus.

Superficial branches have been studied.

Deep branches:

External.

Muscular.

Communicating.

Internal.

Muscular.

Communicating.

Phrenic—lies on anterior surface of scalenus anticus.

Spinal accessory.

Muscles:—

Sterno-cleido-mastoid.
Omo-hyoid.
Trapezius.
Scalenus anticus.
Scalenus medius.
Scalenus posticus.
Splenius.
Levator anguli scapulæ.

DEMONSTRATION VI.

In anterior triangles of the neck.

Note that the carotid artery lies just beneath the anterior border of the sterno-mastoid muscle.

Cut the clavicle at its inner third, disarticulate sternal end, turn it up with the sterno-mastoid muscle, taking care not to remove any of the structures beneath the muscle.

Study the cervical fascia.

Lying on or in the sheath of the carotid artery, internal jugular vein, and vagus nerve you will find the **descendens hypoglossi nerve.** Trace it up to the hypoglossal nerve and down to the communication with the **communicantes hypoglossi,** forming the **ansa.** (Fig. 27.)

FIG. 27.—CENTRAL LINE OF NECK.—COURSE AND RELATIONS OF COMMON CAROTID ARTERY.—(*Holden.*)

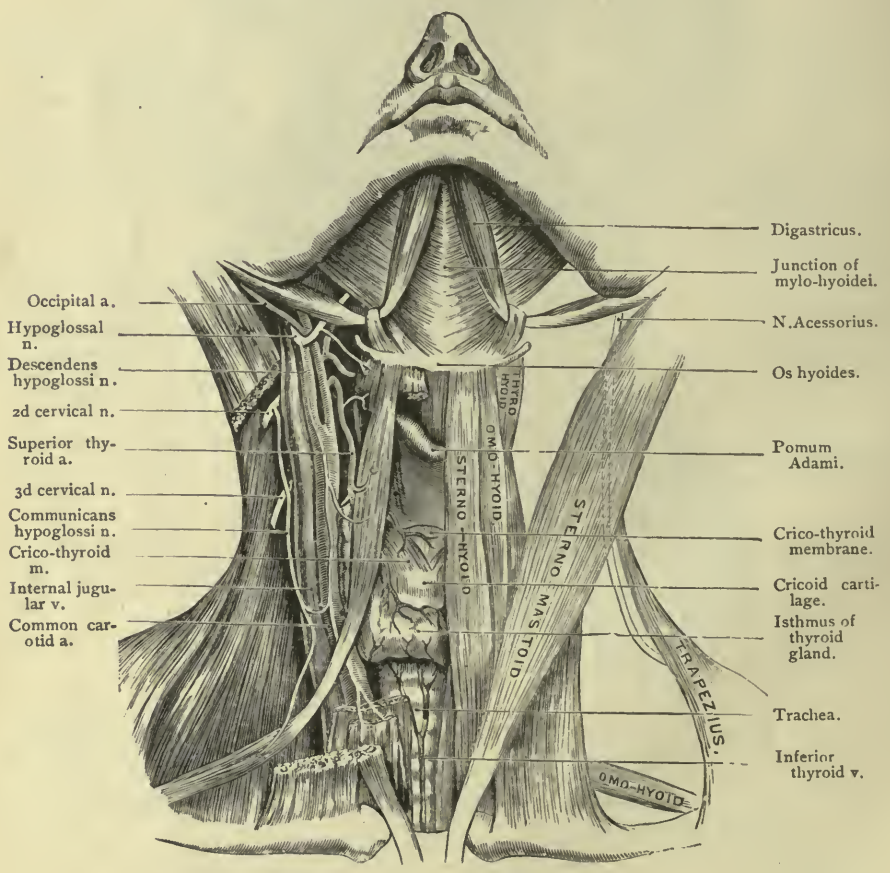
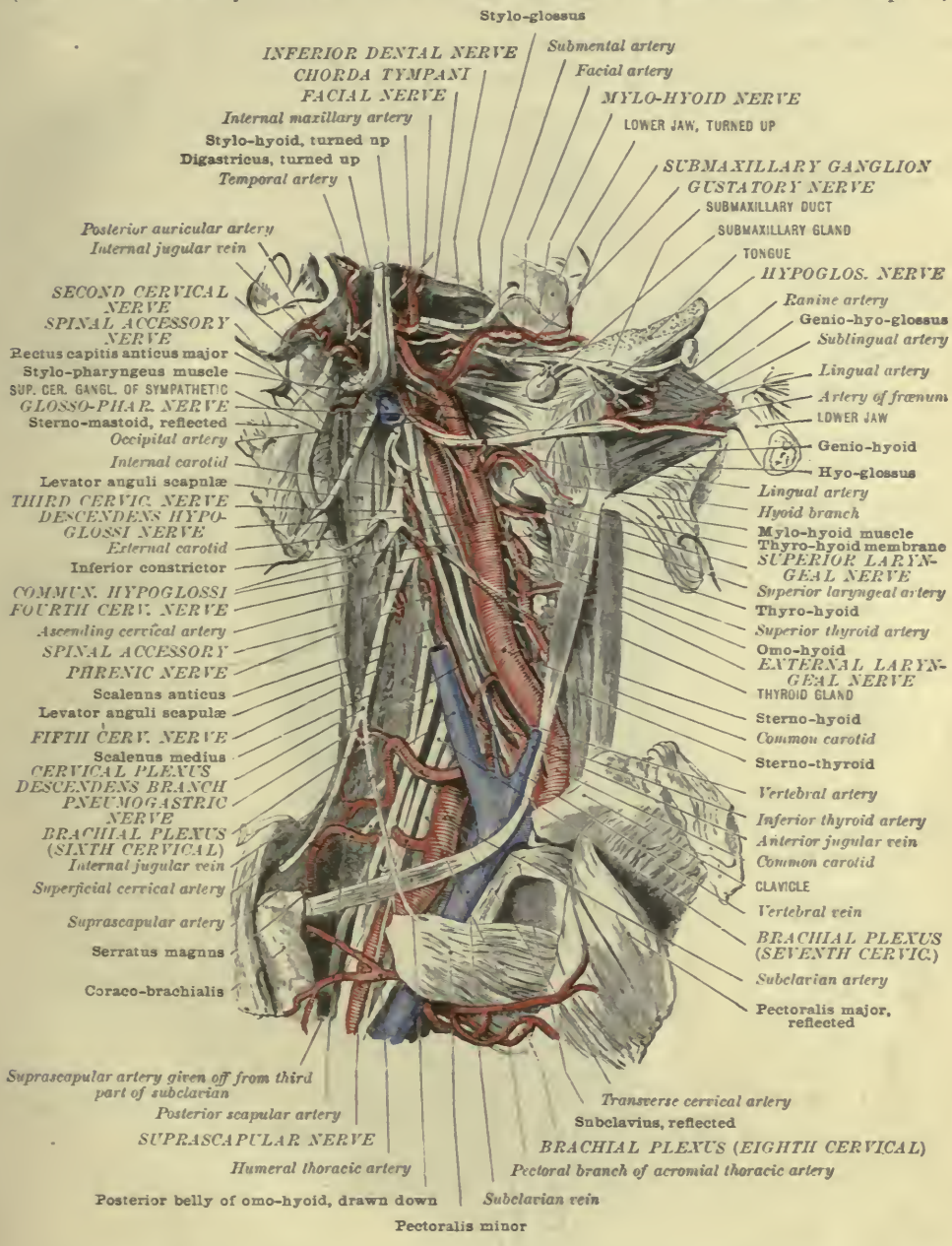


FIG. 28.—THE COMMON CAROTID, THE EXTERNAL AND INTERNAL CAROTID AND THE SUBCLAVIAN ARTERIES OF THE RIGHT SIDE AND THEIR BRANCHES.—(*Morris.*)
(From a dissection by Dr. Alder Smith in the Museum of St. Bartholomew's Hospital.)



Expose the carotid artery, internal jugular vein, and vagus nerve, and note their relative position to each other and to surrounding structures.

Expose the sympathetic gangliated cord behind the carotid sheath. (See Figs. 28 and 29.)

Trace the superior laryngeal nerve to the superior border of thyroid cartilage; note its division into internal and external branches.

Note the division of the common carotid into the external and internal carotid.

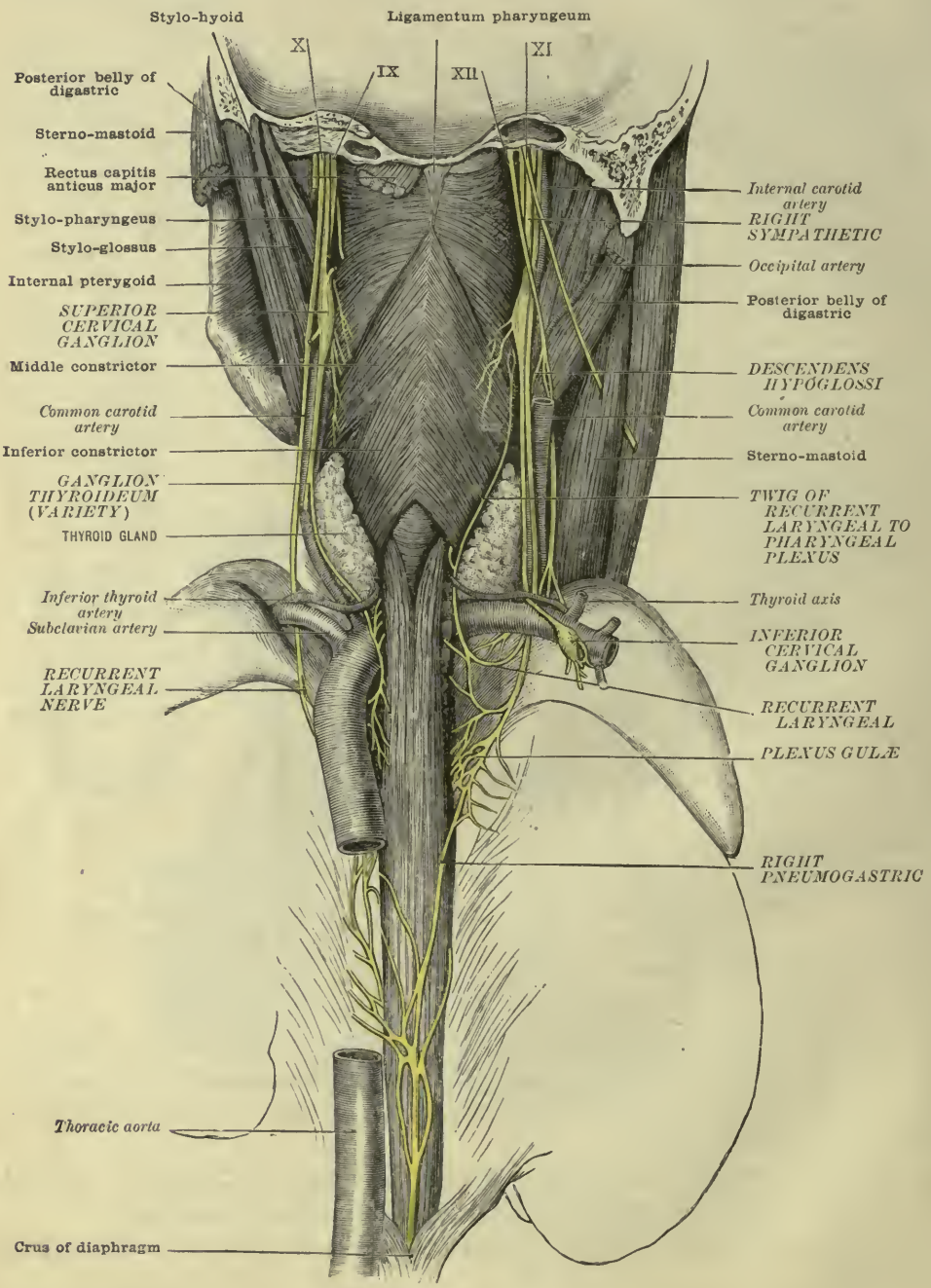
Now expose and study the branches of the external carotid. (See Fig. 28.)

Expose the subclavian artery and its branches. (See Figs. 26 and 28.)

What position does this artery have in relation to the subclavian vein, vagus nerve, and scaleni muscles?

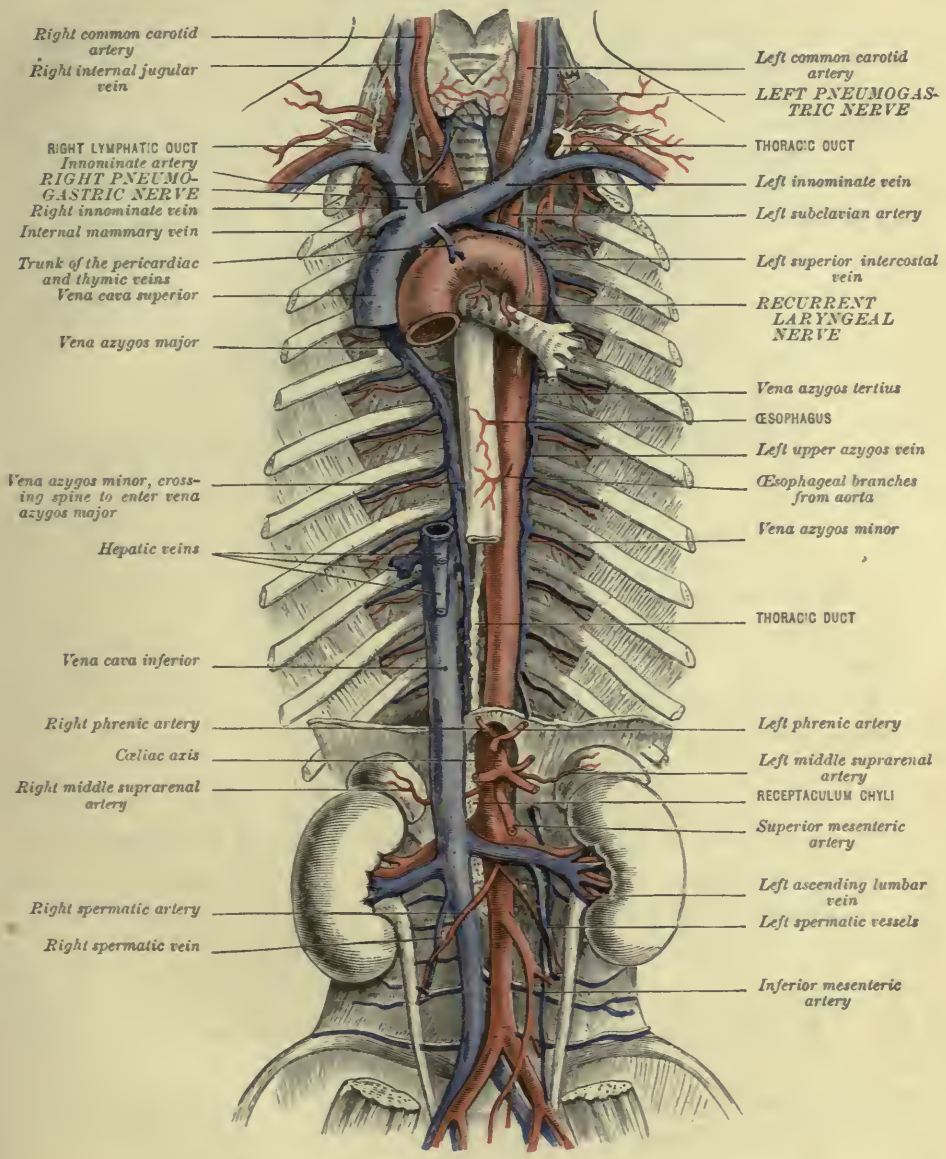
Expose the inferior or recurrent laryngeal nerve lying behind the common carotid artery and in the groove between the trachea and œsophagus.

FIG. 29.—DISTRIBUTION OF THE PNEUMOGASTRIC NERVE, VIEWED FROM BEHIND. (Krause.) (*Morris.*)



Search carefully for the thoracic duct on the left side as it enters the subclavian vein near the junction with internal jugular. (Fig. 30.)

FIG. 30.—THE SUPERIOR AND INFERIOR VENÆ CAVÆ, THE INNOMINATE VEINS, AND THE AZYGOS VEINS.—(*Morris.*)



In the anterior triangle you have the following structures, some of which have been exposed and studied. Clean and study each carefully and note the position each bears to the surrounding structures:—

Nerves:—

Descendens hypoglossi.

Hypoglossal.

Communicantes hypoglossi.

Ansa hypoglossi.
Vagus or pneumogastric.
Pharyngeal.
Superior laryngeal.
Inferior laryngeal.
Phrenic.
Sympathetic.

Arteries:—
Common carotid.
External carotid.
Superior thyroid.
Lingual.
Facial.
Ascending pharyngeal.
Occipital.
Posterior auricular.
Internal carotid.

Veins:—
Internal jugular.
Tributaries to internal jugular.

Review veins of head and neck.
Thoracic duct,—its termination.
Right lymphatic duct.
Review lymphatics of head and neck.

Subclavian artery.
Thyroid axis (*A. truncus thyreo-cervicalis*) and branches.
Vertebral.
Internal mammary.
Superior intercostal (*A. truncus costocervicalis*).

Subclavian vein.
Tributaries to internal jugular.

Muscles (see Fig. 27 and 34):—
Omo-hyoid.
Sterno-hyoid.
Sterno-thyroid.
Thyro-hyoid.
Scaleni.

FIG. 31.—DIAGRAM OF THE SUPERFICIAL LYMPHATIC VESSELS AND GLANDS OF THE HEAD AND NECK. (After Drawing by Dr. Francis R. Sherwood.) (*Morris.*)

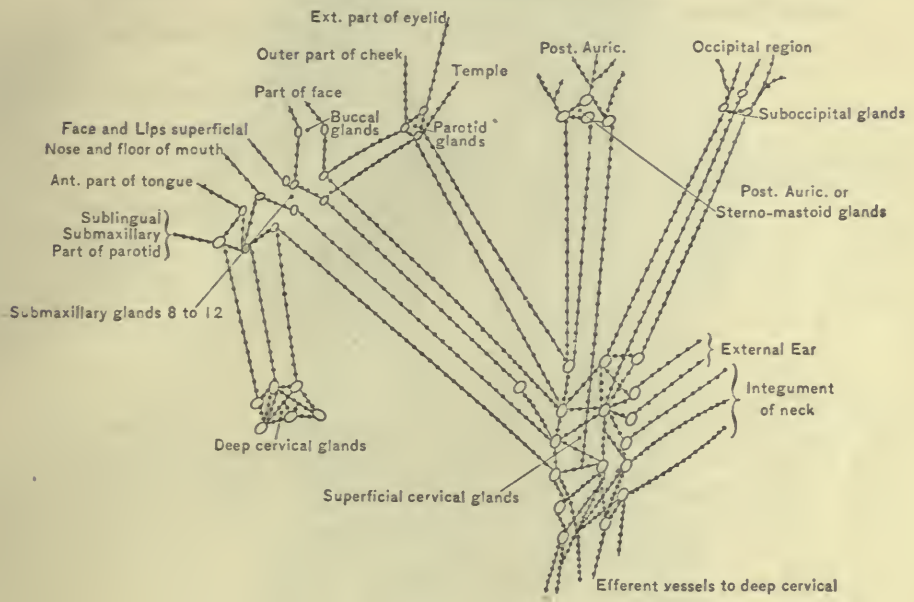
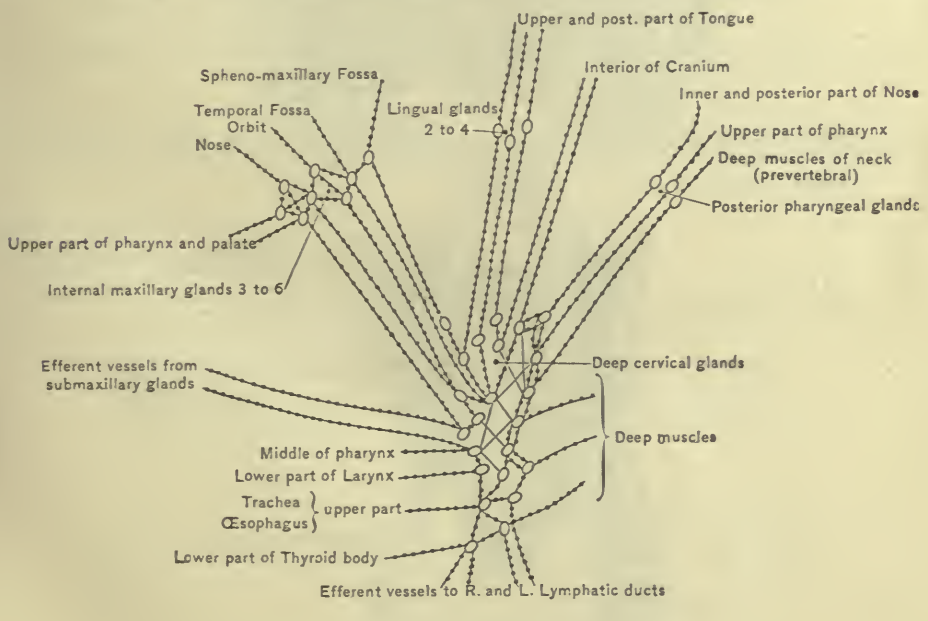


FIG. 32.—DIAGRAM OF THE DEEP LYMPHATIC VESSELS AND GLANDS OF THE HEAD AND NECK. (After Drawing by Dr. Francis R. Sherwood.) (*Morris.*)



Thyroid body or gland.

Position and general description.
Lobes.
Isthmus.
M. levator glandulæ thyroidæ.
Accessory thyroids.
Arteries and veins.

FIG. 33.—VIEW OF THYROID BODY.—(*Morris.*)

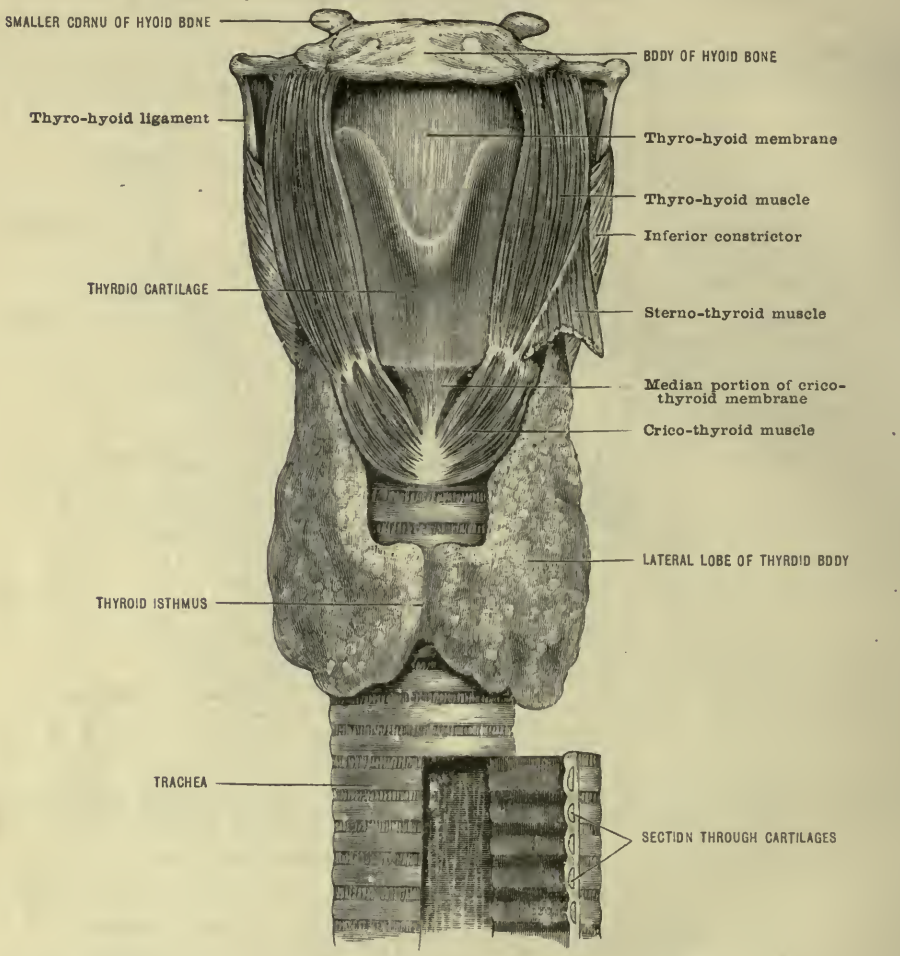


FIG. 34.—THYROID BODY, WITH MIDDLE LOBE AND LEVATOR MUSCLE.—(*Morris.*)

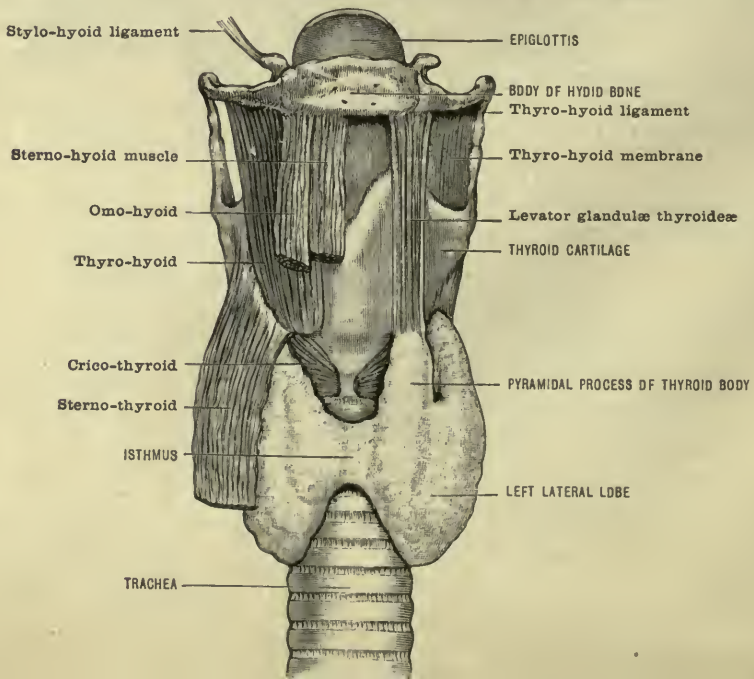
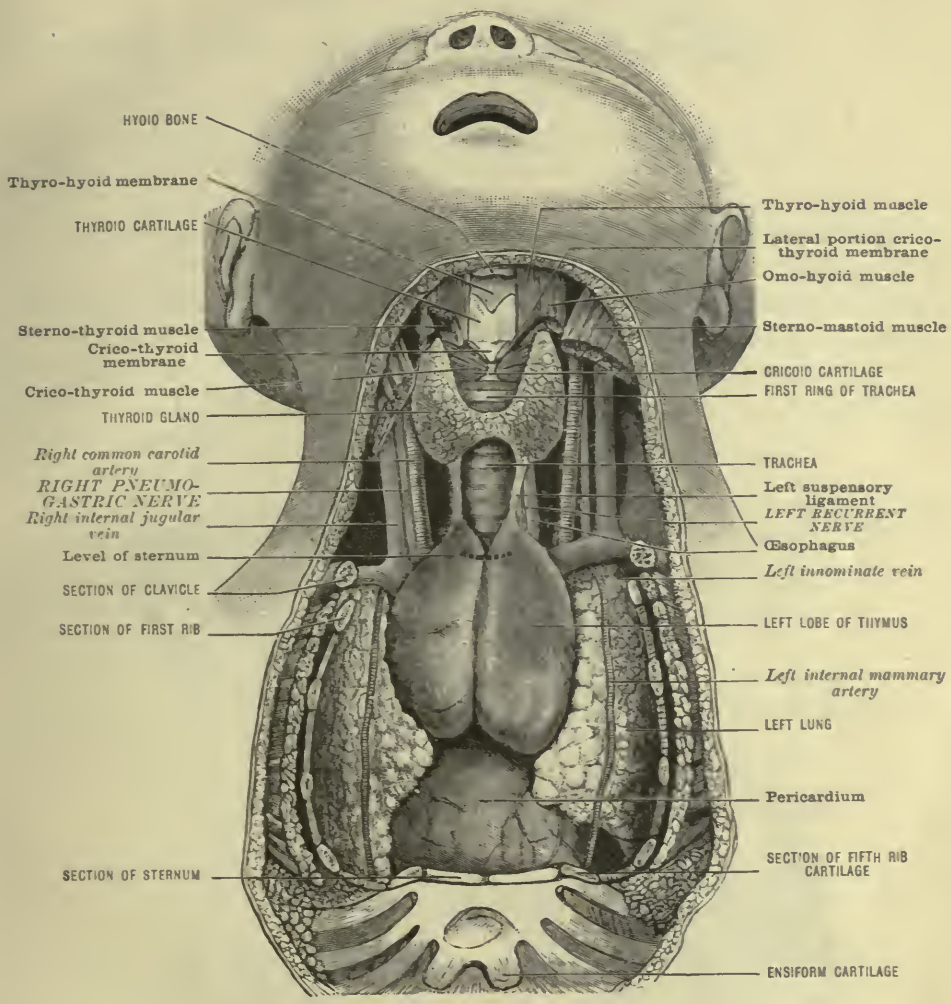


FIG. 35.—THYMUS GLAND IN A CHILD AT BIRTH.—(*Morris.*)



Submaxillary or Digastric Triangle (Fig. 36).

Expose the following superficial structures *only*:—

Submaxillary gland.

Do not remove this gland now.

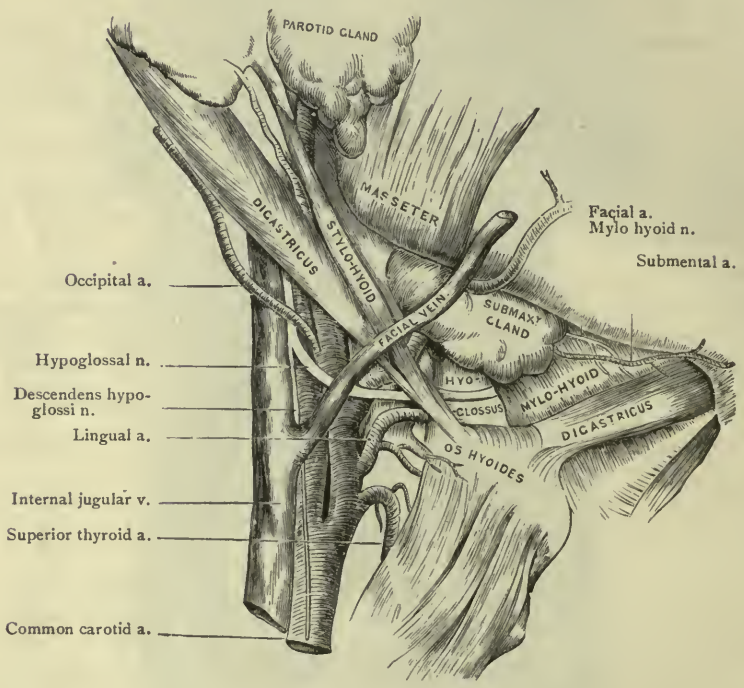
Facial artery.

Hypoglossal nerve.

Muscles:—

Digastric.
Stylo-hyoid.
Mylo-hyoid.

FIG. 36.—DIGASTRIC TRIANGLE AND CONTENTS.—(*Holden.*)



DEMONSTRATION VII.

TEMPORO- AND PTERYGO-MAXILLARY REGION.

Study the temporal fascia and remove it.

Study the masseter fascia and remove it.

Study the **masseter muscle.** (Fig. 7.)

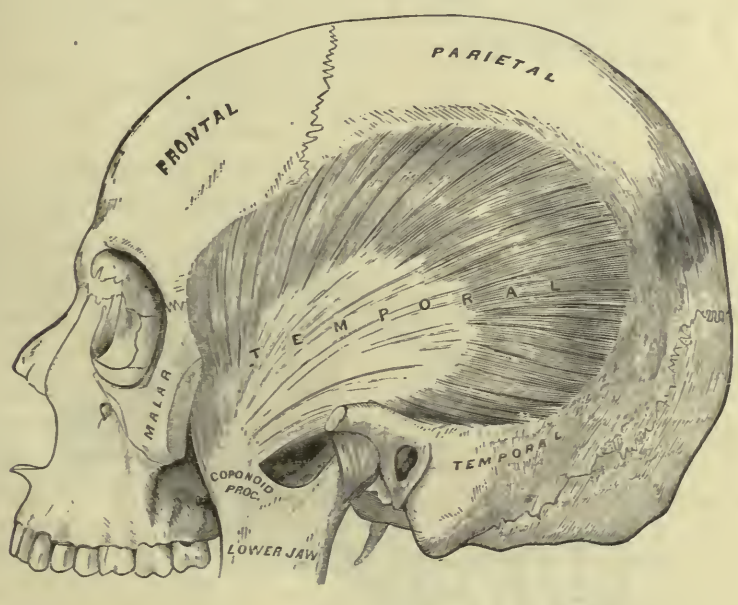
Then cut the zygomatic arch on each side of the masseter muscle. *The posterior cut should be made immediately in front of the glenoid fossa; the anterior cut should extend obliquely through the malar bone.* Now turn the bony arch thus cut with the masseter muscle down; observe the nerve and artery which pass to the muscle through the sigmoid notch between the neck of the jaw and posterior margin of the temporal muscle. When the nerve and artery are found and studied, cut them and remove them with the muscle.

Clean and study the **temporal muscle.**

Then cut the coronoid process of mandible and turn it up with the temporal muscle attached.

Now note the external pterygoid muscle.

FIG. 37.—(*Holden.*)



Clean and study the **external pterygoid muscle** with care so as not to destroy the **internal maxillary artery.** (Figs. 38 and 39.)

FIG. 38.—THE PTERYGOID MUSCLES.—(*Morris.*)

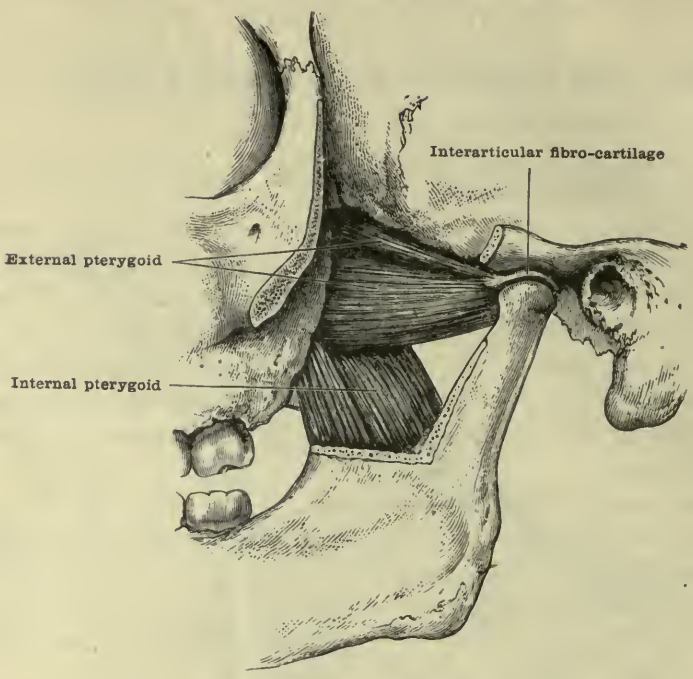
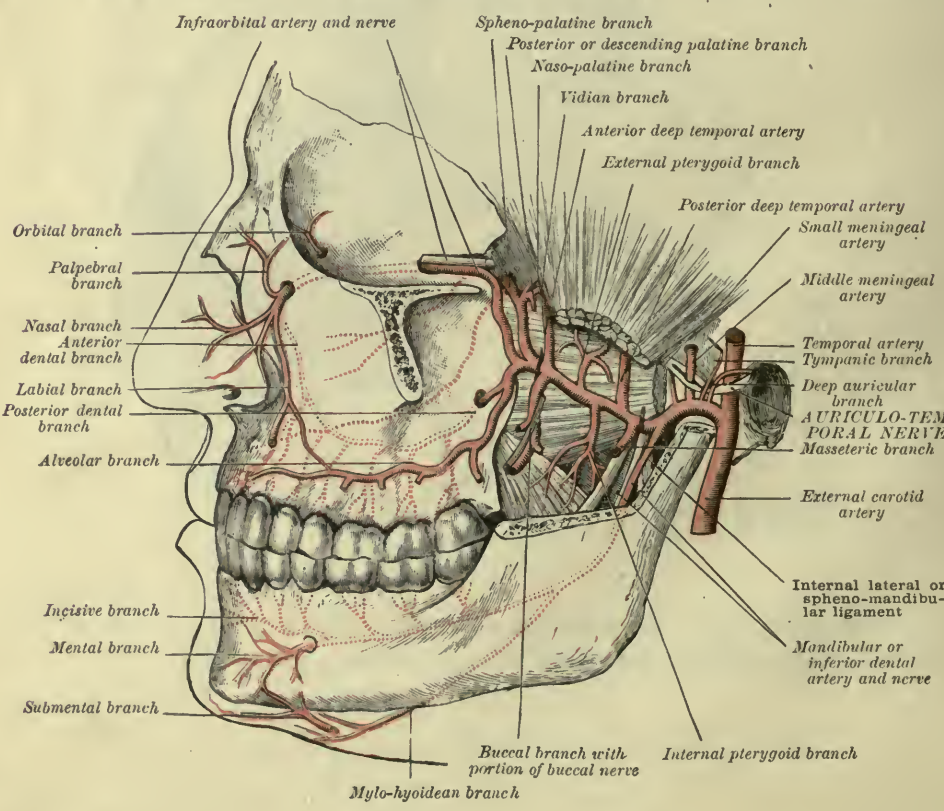


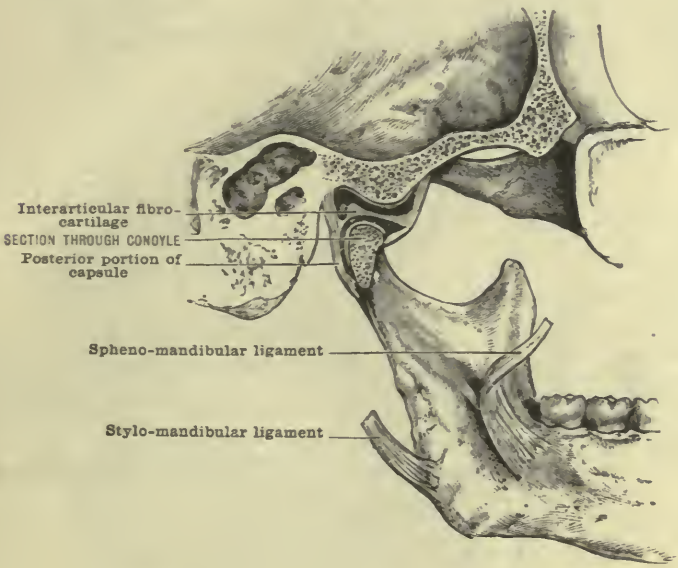
FIG. 39.—SCHEME OF LEFT INTERNAL MAXILLARY ARTERY. (Walsham.) (*Morris.*)



Cut the condyle of the mandible, disarticulate, and remove it, with the external pterygoid muscle.

Study the temporo-mandibular articulation.

FIG. 40.—VERTICAL SECTION THROUGH THE CONDYLE OF JAW TO SHOW THE TWO SYNOVIAL SACS AND THE INTERARTICULAR FIBRO-CARTILAGE.—(*Morris.*)



Next expose the deep pterygoid region by removing the upper part of the ramus of the mandible. *Cut the ramus with saw and bone-pliers immediately above the inferior dental foramen. To find the inferior dental foramen thrust a knife handle down between the ramus and soft parts until its progress is arrested by the entrance of the inferior dental nerve and vessels into the foramen.*

Expose the inferior dental vessels and nerve as far as possible by cutting away part of the mandible with chisel and bone-pliers.

Cut the mandible at the mental foramen and turn the piece cut off up, carefully cutting the insertions of the internal pterygoid and mylo-hyoid muscles and other structures beneath from the bone.

Study the **internal pterygoid muscle.** Note its relation to the external pterygoid. Also note the structures lying between these two muscles.

Expose and study the following structures:—

Arteries:—

Internal maxillary and branches. (See Figs. 39 and 41.)

Veins:—

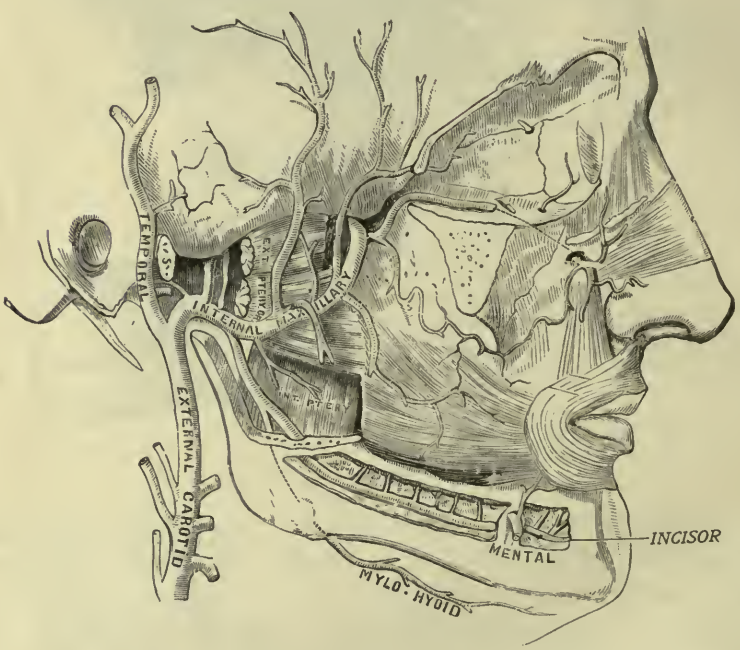
Internal maxillary and its tributaries.

Nerves (Figs. 42 and 43):—

Mandibular division of fifth.

Recurrent.
Internal pterygoid.
Anterior portion.
Temporal.
Masseteric.
External pterygoid.
Long buccal.
Posterior portion.
Lingual.
Inferior dental.
Auriculo-temporal.
Submaxillary ganglion.
Otic ganglion.
Chorda tympani.

FIG. 41.—INTERNAL MAXILLARY ARTERY.—(*Holden.*)



Submaxillary or digastric triangle.

The superficial structures have been worked out.

Deep structures:—

Submaxillary gland.
Submaxillary ganglion. (See Fig. 43.)
Sublingual gland. (Fig. 44.)
Nerves in this triangle:—
Lingual.
Inferior dental.
Hypoglossal.
Chorda tympani.
Arteries (see Figs. 45 and 28):—
Lingual and branches.
Facial (*a. maxillaris externa*).
Inferior dental. (Fig. 41.)
Veins:—
Lingual.
Facial.

FIG. 42.—DISTRIBUTION OF THE MANDIBULAR DIVISION OF THE TRIGEMINAL NERVE. (Henle.) (*Morris.*)

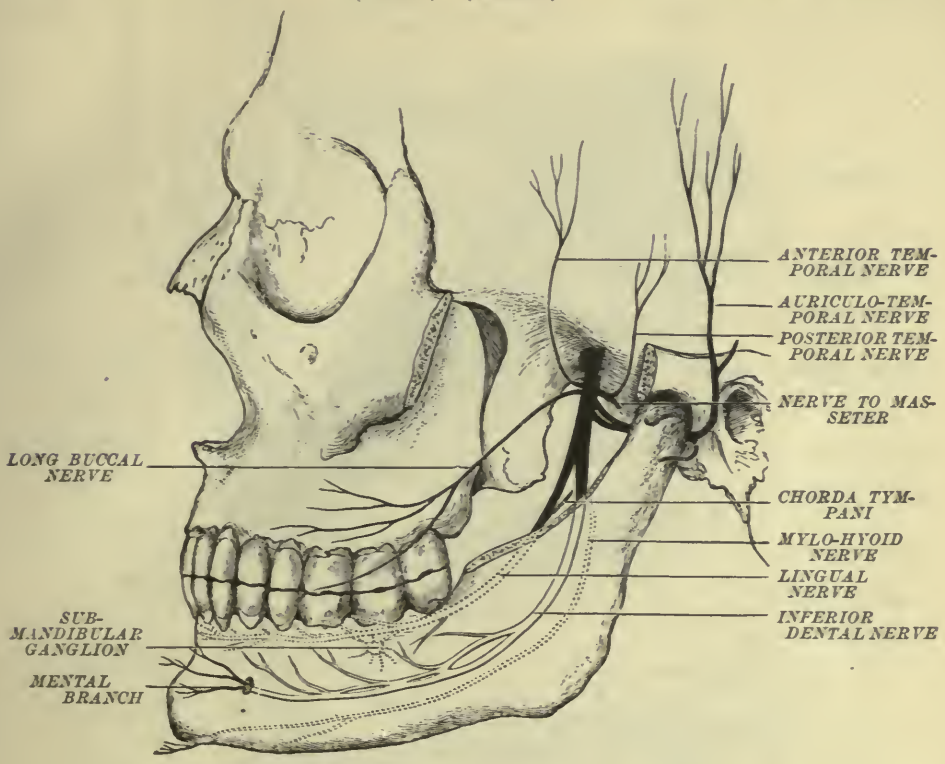


FIG. 43.—SHOWING FIFTH NERVE. (*Holden.*)

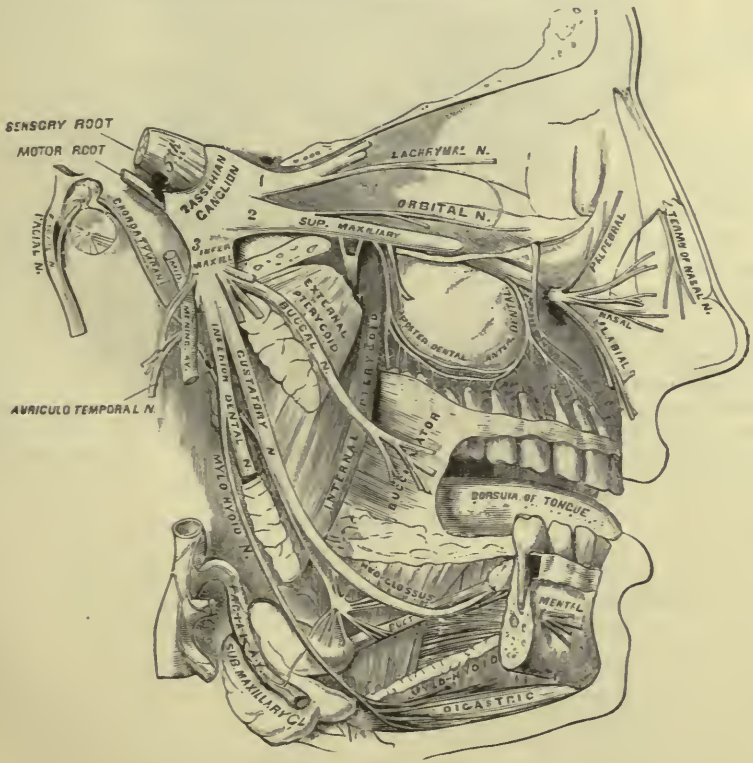


FIG. 44.—THE SALIVARY GLANDS.—(*Morris.*)

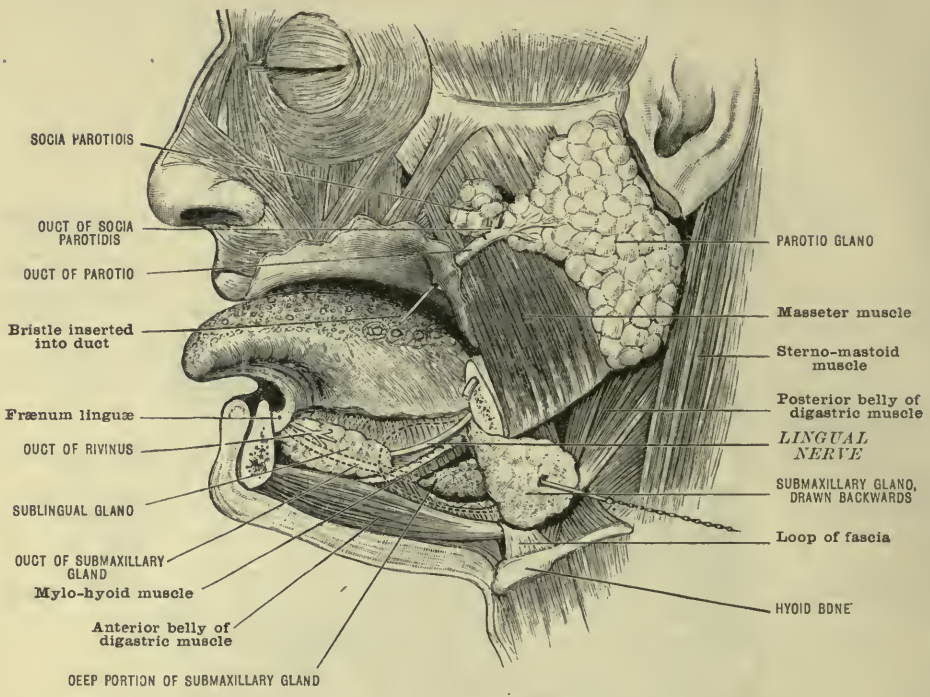
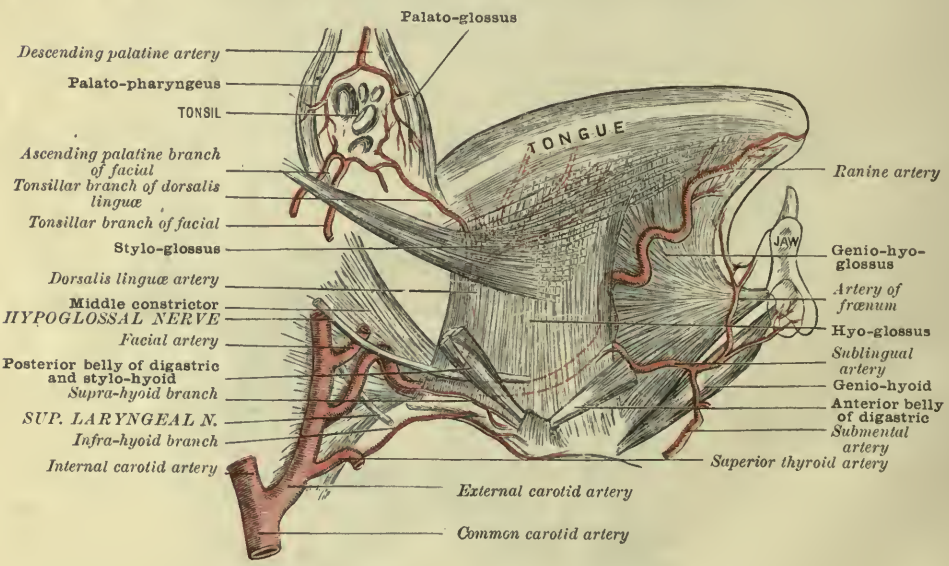


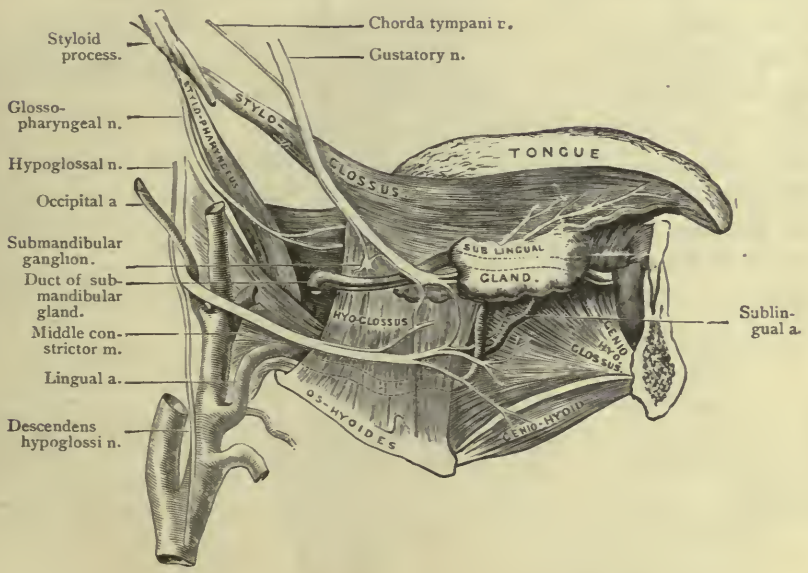
FIG. 45.—SCHEME OF THE RIGHT LINGUAL ARTERY. (Walsham.) (*Morris.*)



Muscles (Figs. 45 and 46):—

Mylo-hyoid.
Hyo-glossus.
Genio-hyoid.
Stylo-glossus.
Genio-hyo-glossus (*m. genïoglossus*).
Chondro-glossus.

FIG. 46.—MUSCLES, VESSELS, AND NERVES OF THE TONGUE.—(*Holden.*)



DEMONSTRATION VIII.

DEEP DISSECTION OF THE NECK. (Figs. 28 and 47.)

Expose the **ascending pharyngeal artery.**

Trace to the base of the cranium the:—

Internal carotid artery.

Internal jugular vein.

Vagus nerve.

Hypoglossal nerve.

Gangliated cord.

Note the cervical ganglia of the sympathetic.

Clean and study the **stylo-pharyngeus muscle.** Use care so as not to cut the **glosso-pharyngeal** nerve, which winds around the posterior and external surface of the stylo-pharyngeus muscle.

Trace and study the glosso-pharyngeal nerve.

Branches of seventh nerve at its exit through stylo-mastoid foramen.

Digastric.

Stylo-hyoid.

Posterior auricular.

Note the position of the internal carotid artery in relation to the following structures:—

Muscles:—

Middle constrictor of the pharynx.

Superior constrictor of the pharynx.

Stylo-pharyngeus.

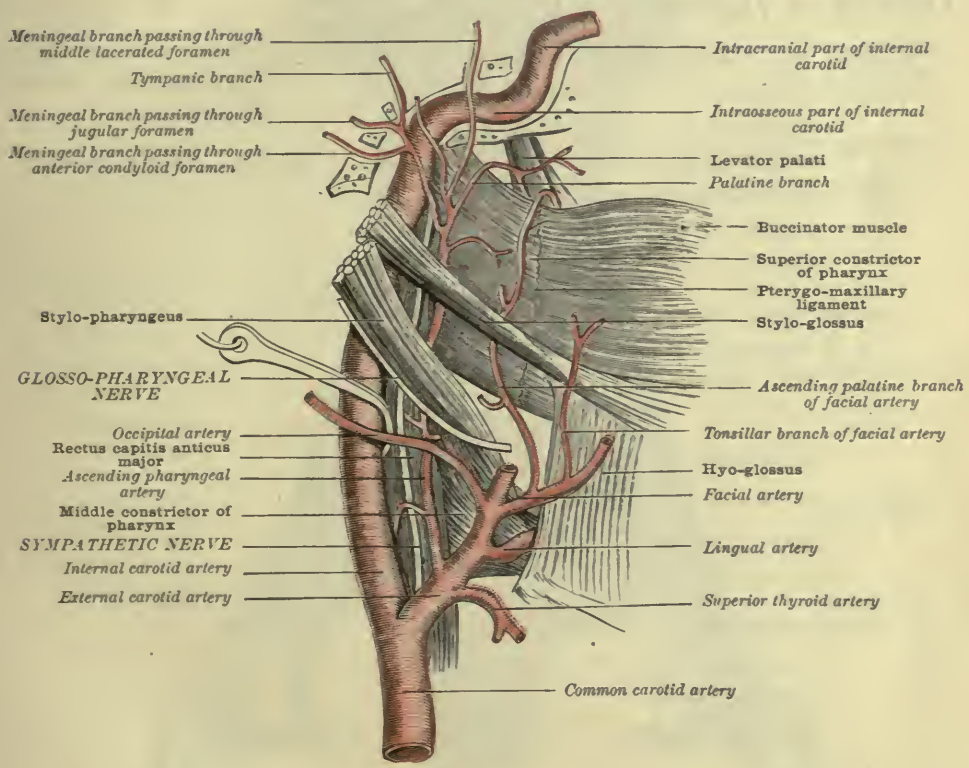
Stylo-glossus.

Ascending pharyngeal artery.

Glosso-pharyngeal nerve.

FIG. 47.—SCHEME OF RIGHT ASCENDING PHARYNGEAL ARTERY. (Walsham.) (*Morris.*)
The internal carotid artery is hooked aside.

Also see Figs. 30 and 50.



DEMONSTRATION IX.

Remove the anterior part of the skull with pharynx attached by dividing the trachea and œsophagus about one inch below the larynx. Draw the trachea and œsophagus forward and separate them from their arterial and vertebral attachments. With a saw cut inward along the posterior border of petrous portion of temporal bone, passing behind the jugular foramen. Divide the basilar part of occipital bone with a chisel.

Wrap the part thus severed in a wet cloth and lay it aside while the anterior vertebral region is being dissected.

ANTERIOR VERTEBRAL REGION.

Expose and study the following structures:—

Muscles (Fig. 48):—

- Longus colli.
- Rectus capitis anticus major.
- Rectus capitis anticus minor.
- Rectus capitis lateralis.
- Scaleni.

Arteries (Fig. 49):—

- Vertebral and branches.
- Deep cervical.

Veins:—

- Vertebral and tributaries.

Nerves:—

- Trunks of cervical plexus. (Fig. 50.)
- Trunks of brachial plexus.

Study articulations of head.

- Atlas with occiput.
- Atlas and axis.
- Axis and occiput.

PHARYNX. (Figs. 51 and 52.)

Moderately distend the walls of the pharynx with tow.

Study a description of the pharynx. Then clean and study the **inferior, middle,** and **superior constrictor muscles.**

Study the pharyngeal aponeurosis.

Now open the pharynx by a posterior median incision. (Fig. 53.)

Study the interior of the pharynx. Examine,—posterior nares, opening of Eustachian tube, opening into larynx, pharyngeal recess or fossa of Rosenmüller, pharyngeal tonsil, pharyngeal bursa, base of tongue and beginning of œsophagus.

FIG. 48.—THE MUSCLES OF THE FRONT OF THE NECK.—(*Morris.*)

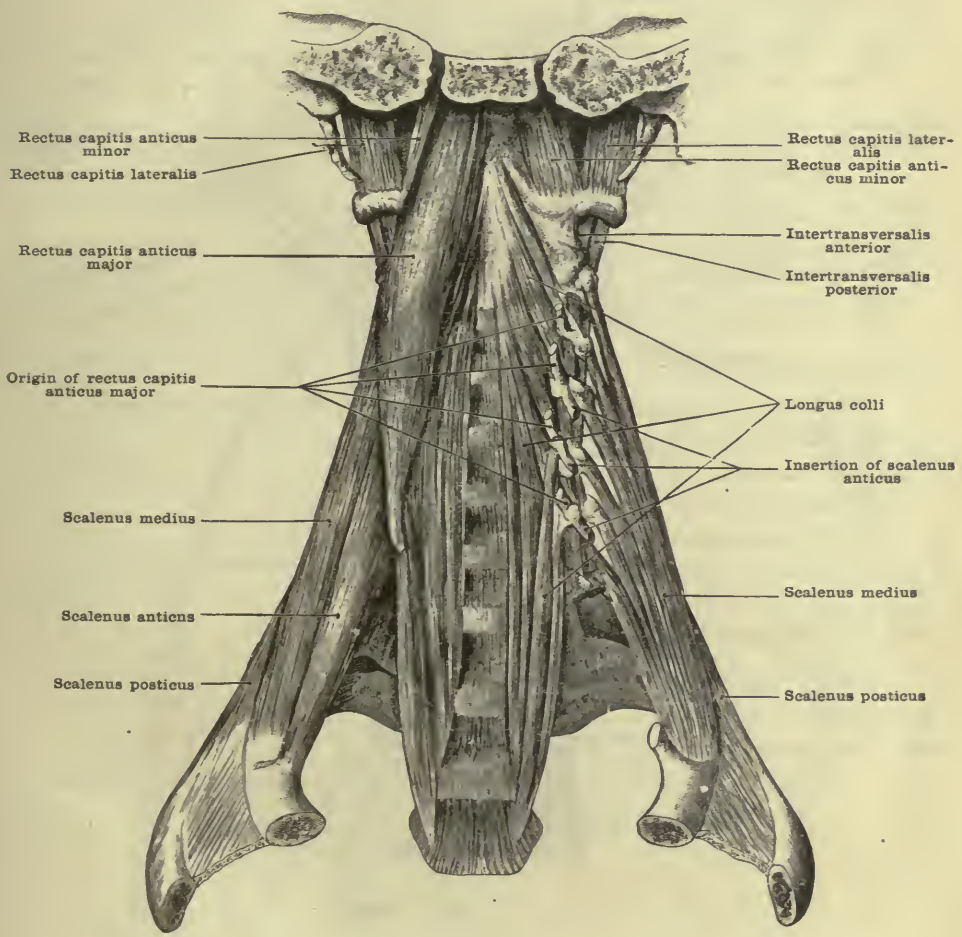


FIG. 49.—SCHEME OF THE LEFT VERTEBRAL ARTERY. (Walsham.) (*Morris.*)
The internal jugular and vertebral veins are hooked aside to expose the artery.

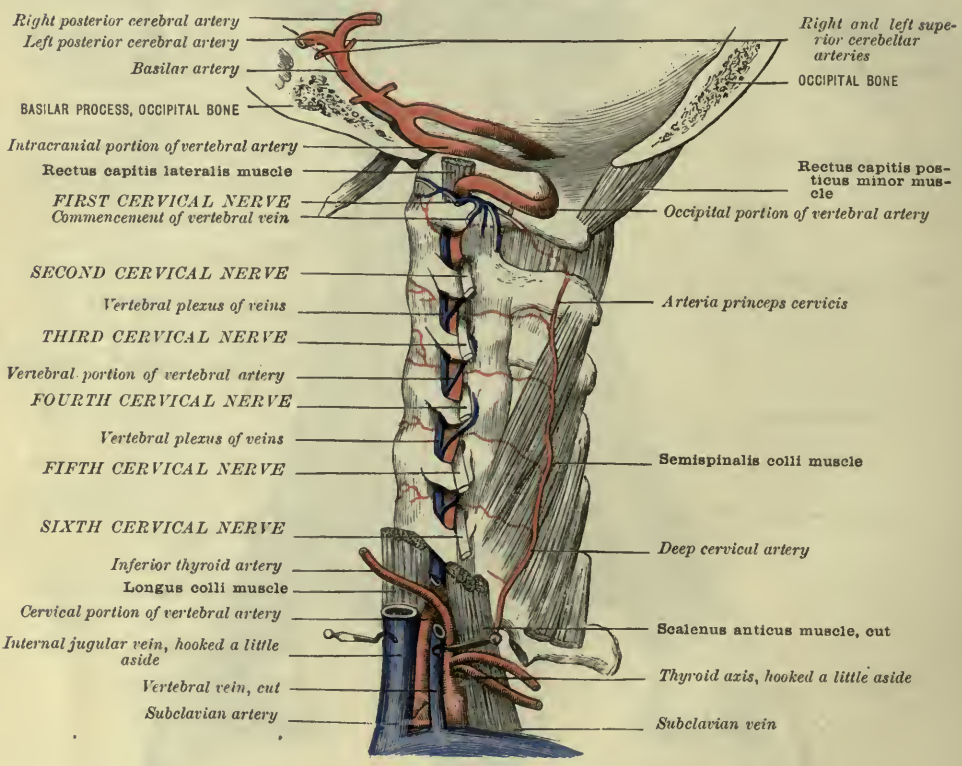


FIG. 50.—DIAGRAM OF THE CERVICAL PLEXUS.—(*Morris.*)

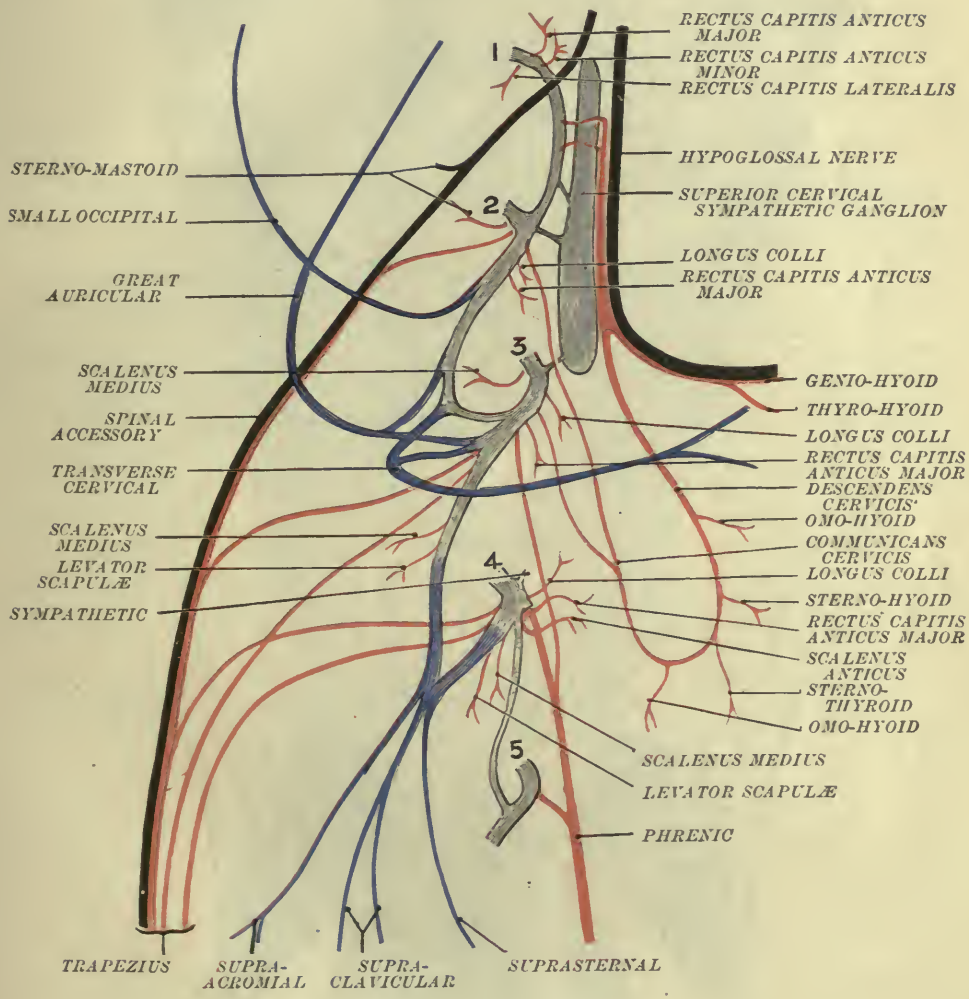


FIG. 51.—SIDE VIEW OF THE MUSCLES OF THE PHARYNX.—(*Holden.*)

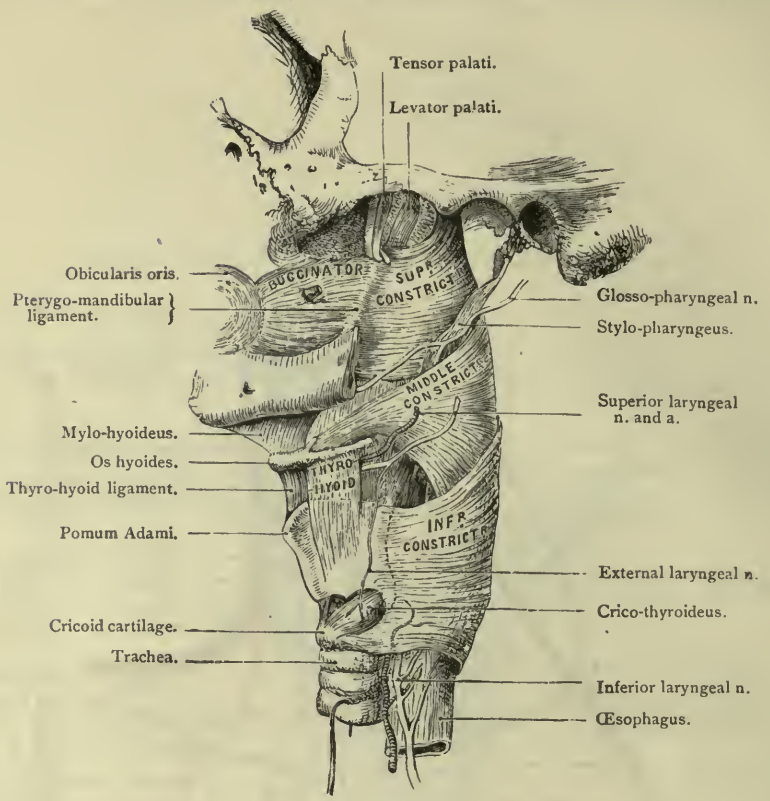


FIG. 52.—VIEW OF THE CONSTRICTOR MUSCLES FROM BEHIND.—(*Holden.*)

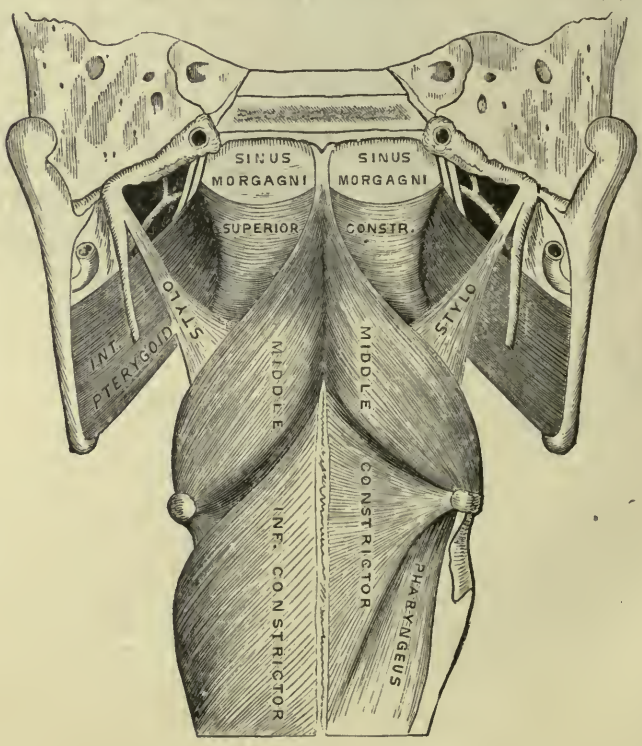
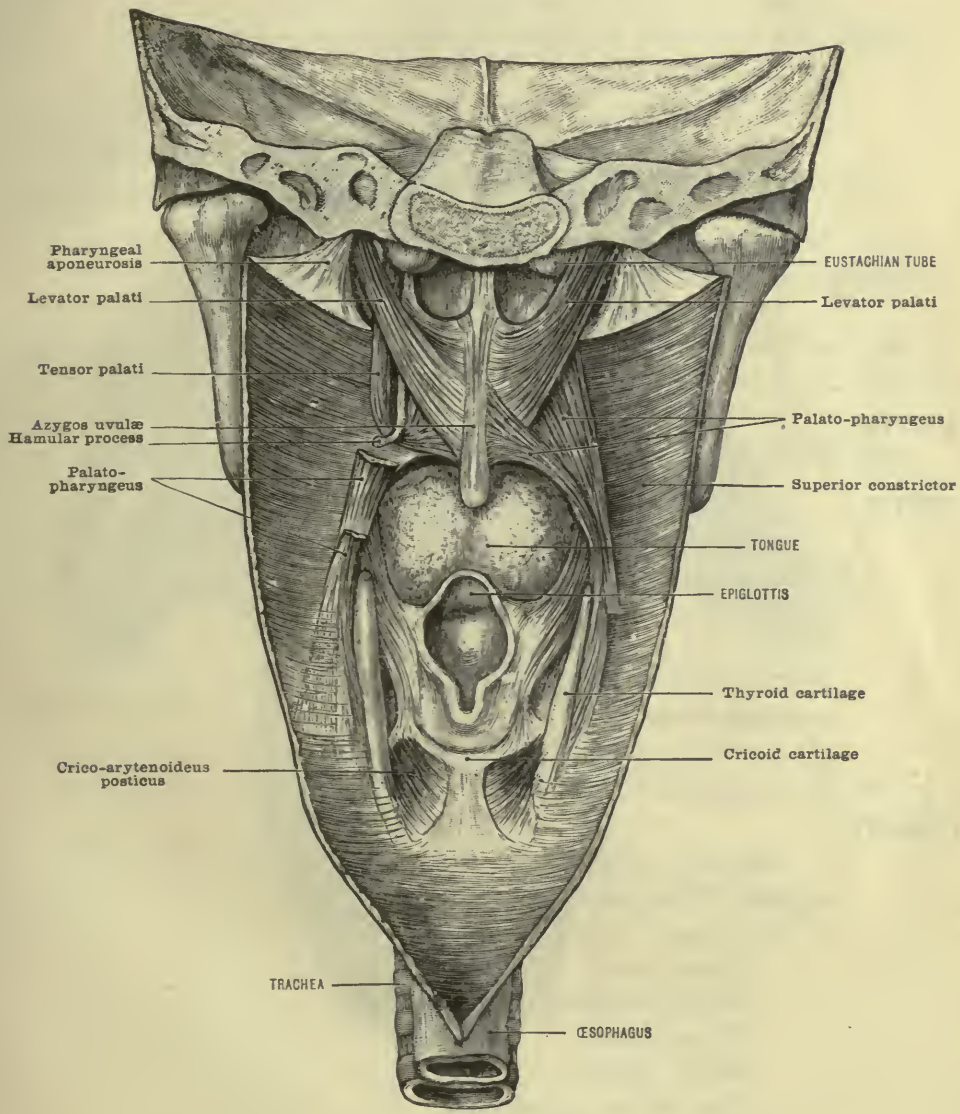


FIG. 53.—VIEW OF MUSCLES OF SOFT PALATE, AS SEEN FROM WITHIN THE PHARYNX. (Modified from Bourgery.) (*Morris.*)



PALATE.

Study description of hard and soft palate.

Soft palate:—

Anterior palatine arch or pillar.
Posterior palatine arch or pillar.
Tonsillar recess.
Isthmus of fauces.
Uvula.

Dissect out and study the following muscles (Fig. 53):—

Palato-pharyngeus.
Palato-glossus.
Levator palati (*M. levator veli palatini*).
Tensor palati (*M. tensor veli palatini*).
Azygos uvulæ (*M. uvulæ*).
Salpingo-pharyngeus.

Tonsils,—faucial.

Their location and description.

Describe the arteries, veins, and nerves of the pharynx, palate, and tonsils.

MOUTH.

Study a description of mouth.

TEETH.

General description.
Temporary or milk teeth:—
How many?
At what ages do their eruptions occur?
Permanent teeth.
How many?
At what ages do their eruptions occur?

What is the arterial and nerve supply of the teeth?

TONGUE.

General description.
Muscles of tongue:—
Extrinsic. (See Fig. 60.)
Hyo-glossus.
Genio-hyo-glossus.
Stylo-glossus.
Palato-glossus.
Part of sup. constrictor.
Intrinsic. (See Fig. 60).
Lingualis superior.
Lingualis inferior.
Transverse fibres.
Vertical fibres.

What is the arterial and nerve supply of the tongue?

FIG. 54.—DORSUM OF THE TONGUE.—(*Morris.*)

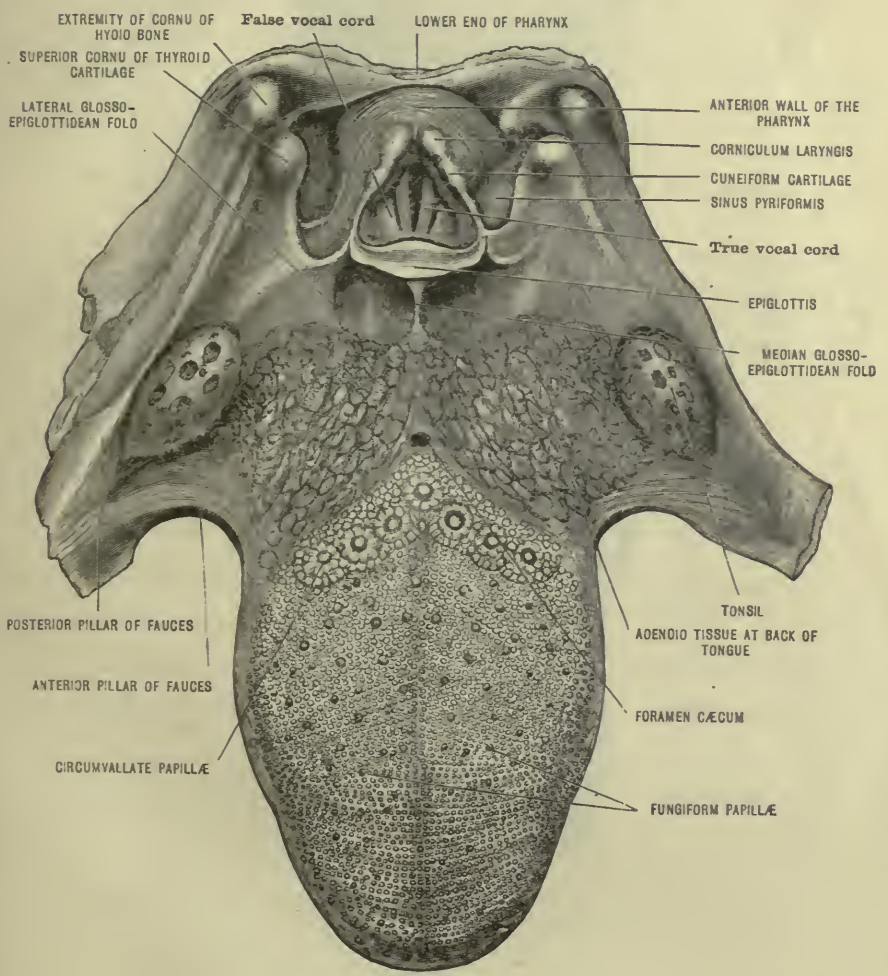
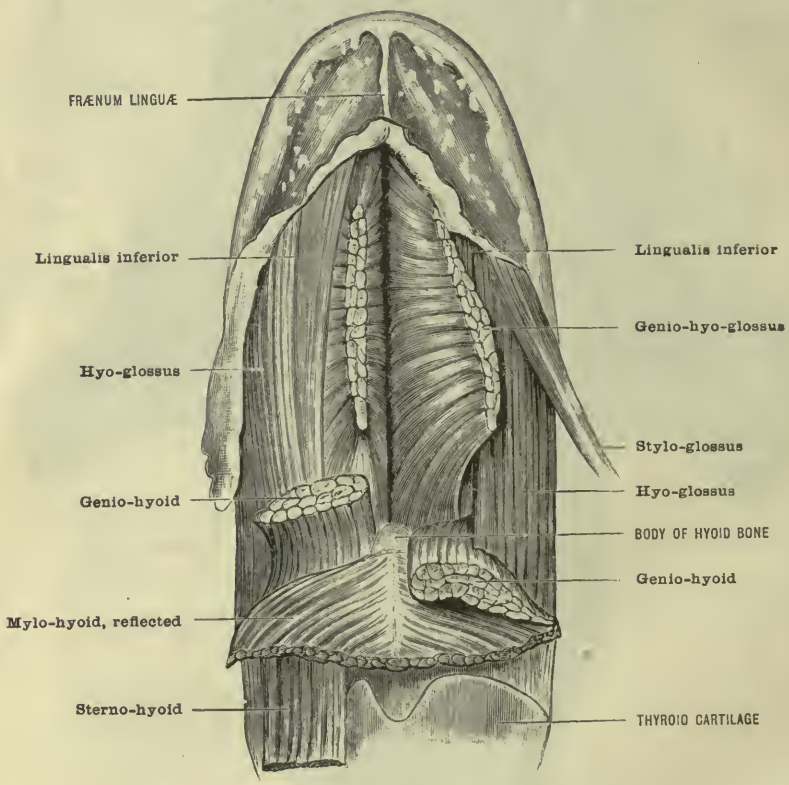


FIG. 55.—UNDER SURFACE OF THE TONGUE WITH MUSCLES.—(*Morris.*)

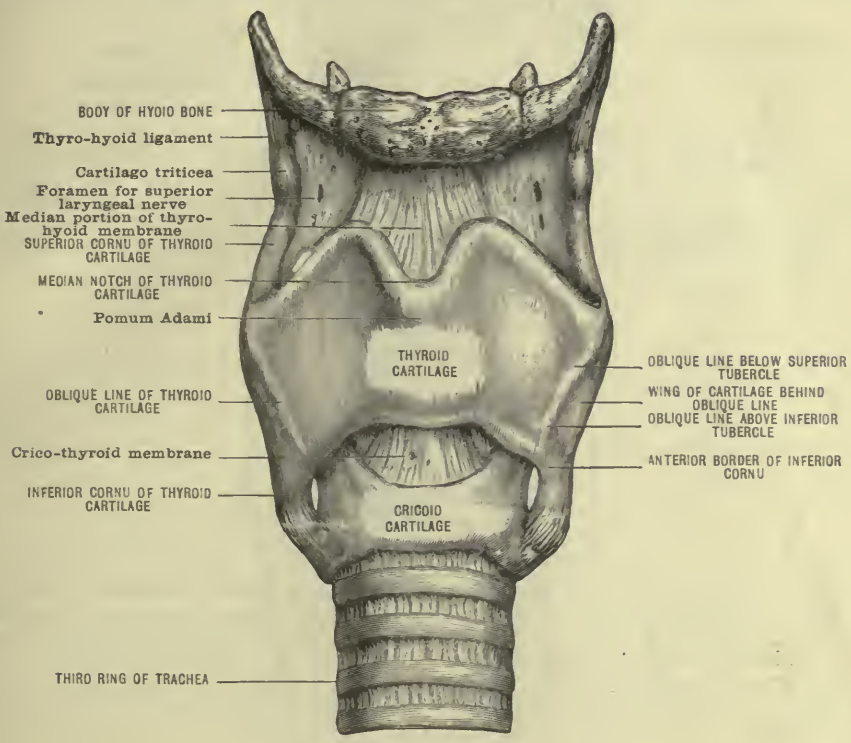


LARYNX.

General description.

Note its position, and its relation to the pharynx.

FIG. 56.—FRONT VIEW OF THE CARTILAGES OF THE LARYNX. (Modified from Bourgery and Jacob.) (*Morris.*)



Note the following:—

Connection with the tongue. (Fig. 54.)

- Median glosso-epiglottic fold.
- Lateral glosso-epiglottic fold.
- Epiglottic vallecula.

Superior aperture of larynx. (Fig. 54.)

- Epiglottis.
- Aryteno-epiglottic fold.
- Cuneiform cartilage.
- Carniculum laryngeus.
- Inter-arytenoid fold.
- Sinus pyriformis.
- Lower end of pharynx.

Inside of larynx.

- Cushion or tubercle of the epiglottis.
- Vocal process of arytenoid cartilage.

FIG. 57.—SIDE VIEW OF THE CARTILAGES OF THE LARYNX. (Modified from Bourgery and Jacob.) (*Morris.*)

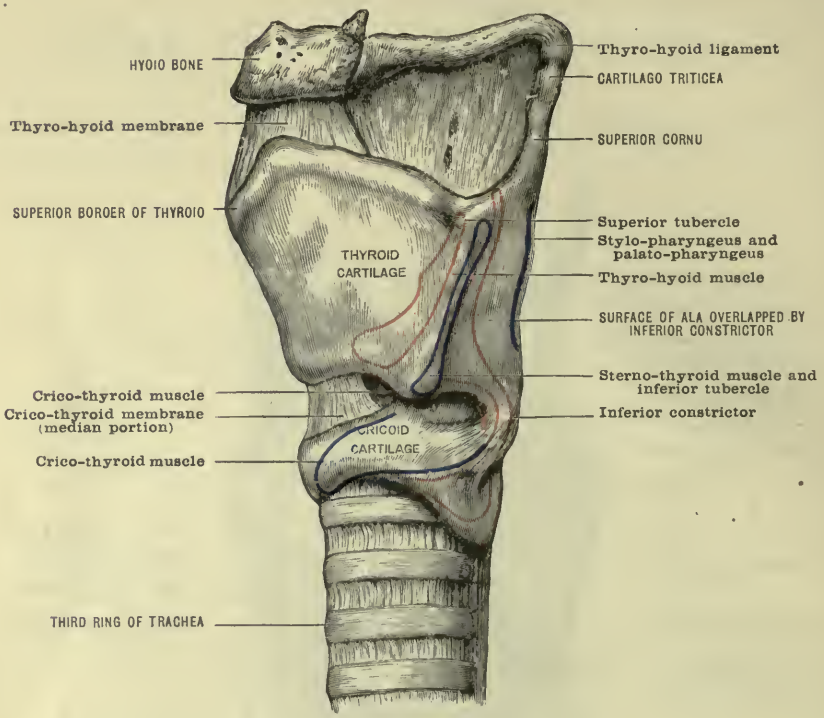
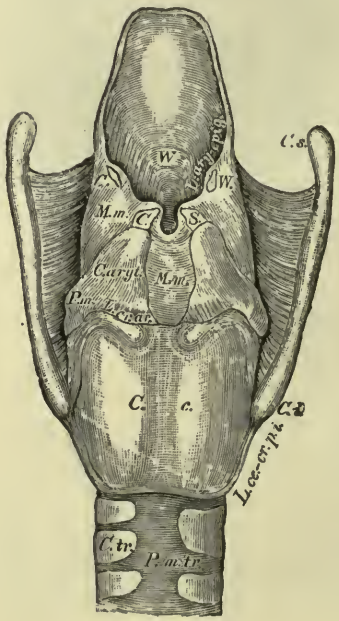


FIG. 58.—POSTERIOR VIEW OF THE LARYNX, WITH THE MUSCLES REMOVED.—(*Holden.*)

E., Epiglottis cushion (W.); *L. ar.-ep.*, Aryteno-epiglottic fold or ligament; *M.m.*, Membrana mucosa; *C. W.*, Cartilage of Wrisberg or cuneiform; *C. S.*, Cartilage of Santorini or cornicula laryngis; *C. aryt.*, Arytenoid cartilage; *C. c.*, Cricoid cartilage; *P. m.*, Muscular process or external angle; *L.cr.-ar.*, Cricoarytenoid ligament; *C. s.*, Superior cornu; *C. i.*, Inferior cornu of the thyroid cartilage; *L. ce.-cr. p. i.*, Posterior inferior cerato-cricoid ligament; *C. tr.*, Tracheal cartilage; *P. m. tr.*, Membranous portion of the trachea.



True vocal cords.
False vocal cords.
Ventricle of larynx.
Rima glottidis.

Study the cartilages of the larynx. (Fig. 58.)

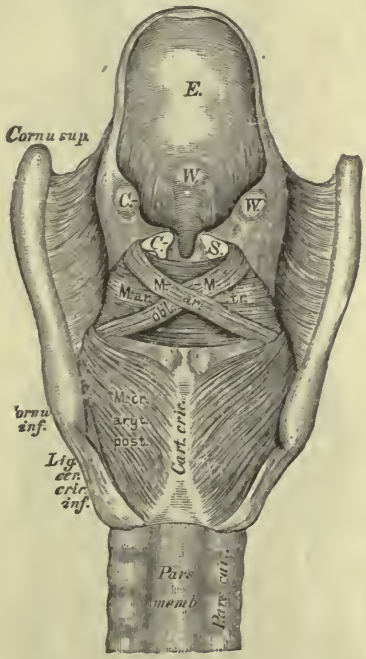
Note the articulations of the thyroid, cricoid, and arytenoid cartilages.

Clean and study the **muscles:**—

Crico-thyroid.

FIG. 59.—POSTERIOR VIEW OF THE LARYNX, WITH ITS MUSCLES.—(*Holden.*)

E., Epiglottis, with the cushion (W.); *C.W.*, Cartilage of Wrisberg; *C.S.*, Cartilage of Santorini; *Cart. cric.*, Cricoid cartilage; *Cornu sup.*, Superior cornu of the thyroid cartilage; *M. ar. tr.*, Transverse portion of the arytenoideus; *Mm. ar. obl.*, Oblique portion of the arytenoideus; *M. cr. aryt. post.*, Crico-arytenoideus muscle; *Pars cart.*, Cartilaginous rings of the trachea; *Pars memb.*, Tracheal membrane.



Crico-arytenoides posticus.
Arytenoides.

Now cut the thyroid cartilage a little to one side of the anterior median line, disarticulate the inferior cornu from cricoid cartilage and remove this part of thyroid cartilage. Then expose the muscles:—

Crico-arytenoides lateralis.
Thyro-arytenoides.
Aryteno-epiglottideus.
Thyro-epiglottideus.

Study closely the action of the laryngeal muscles.

FIG. 60.—SIDE VIEW OF THE MUSCLES AND LIGAMENTS OF THE LARYNX.—(*Morris.*)

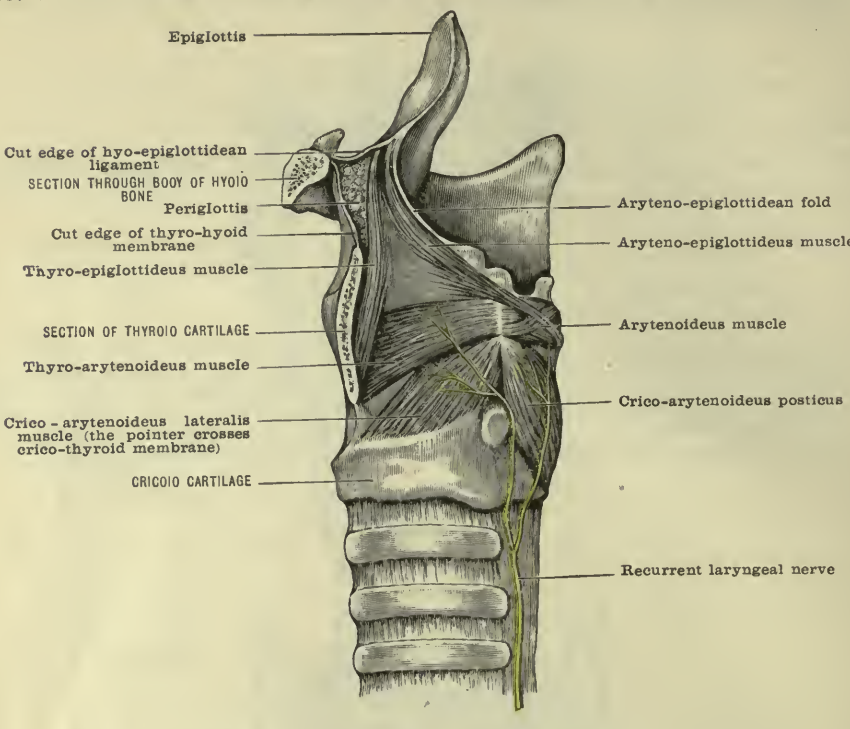
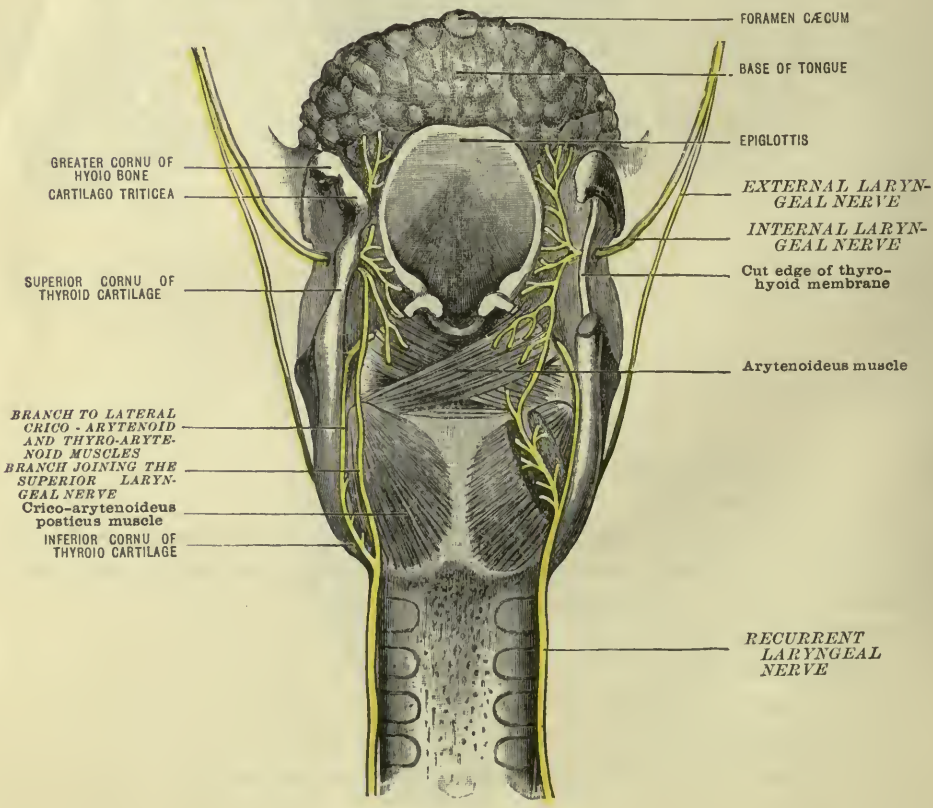


FIG. 61.—NERVES OF THE LARYNX (POSTERIOR VIEW.)—(*Morris.*)



Study the thyro-hyoid membrane, crico-thyroid membrane, inferior thyro-arytenoid ligament, superior thyro-arytenoid ligament, true vocal cords, rima glottidis, ventricle, false vocal cords, laryngeal pouch or sacculus laryngis, and the mucous membrane.

Describe the nerve supply of the larynx (See Fig. 61):—

Superior laryngeal.

Inferior or recurrent laryngeal.

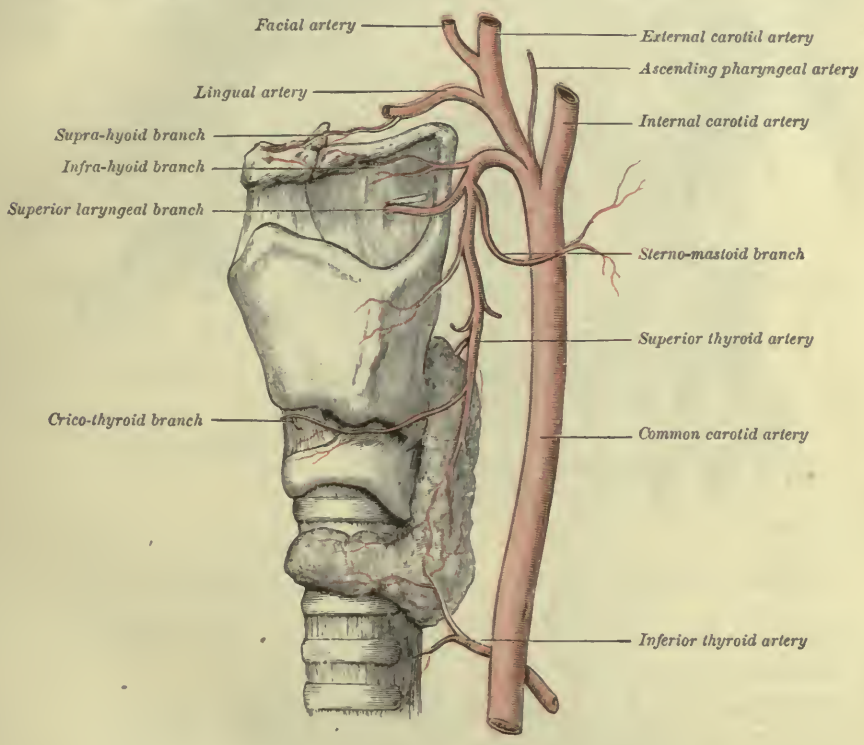
Describe the arteries of the larynx (See Fig. 62):—

Branches of superior thyroid.

Branches of inferior thyroid.

Dorsalis lingual.

FIG. 62.—SCHEME OF LEFT SUPERIOR THYROID ARTERY. (Walsham.) (*Morris.*)



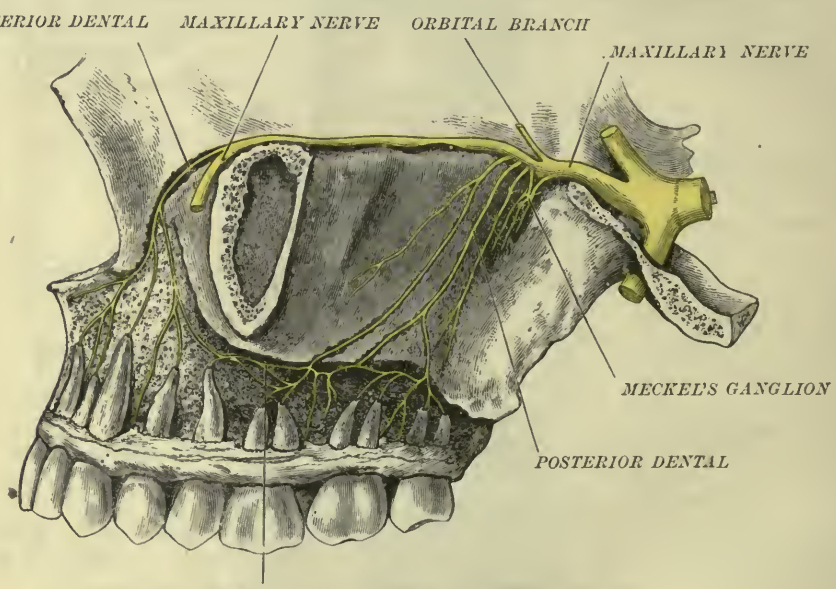
DEMONSTRATION X.

SUPRA-MAXILLARY REGION.

With a saw cut through the squamous portion of the temporal bone to within one-fourth of an inch of the foramen rotundum. With a hammer break out the portion of bone in front of the incision. Then begin at the Gasserian ganglion and trace out the superior maxillary division of the fifth nerve across the spheno-maxillary fossa to the infra-orbital canal.

Deep in the spheno-maxillary fossa and just below the superior maxillary nerve find Meckel's ganglion. (Figs. 63 and 66.)

FIG. 63.—THE MAXILLARY NERVE SEEN FROM WITHOUT. (Beaunis.) (*Morris.*)



Trace and study the branches of superior maxillary nerve:—
Recurrent meningeal.
Spheno-palatine.
Orbital or temporo-malar.
Posterior superior dental.
Middle superior dental.
Anterior superior dental.
Review the third division of the internal maxillary artery.

NOSE.

Study general description of the nose.

Open the nasal cavity by a vertical incision to one side of median line so as to escape the septum. (Figs. 64 and 65.)

Study the septum.

Study the turbinate bones and meatuses and the openings into each.

What is the nerve and arterial supply of the nose?

FIG. 64.—SECTION SHOWING BONY AND CARTILAGINOUS SEPTUM.—(*Morris.*)
The dotted lines indicate the course of the anterior palatine canal.

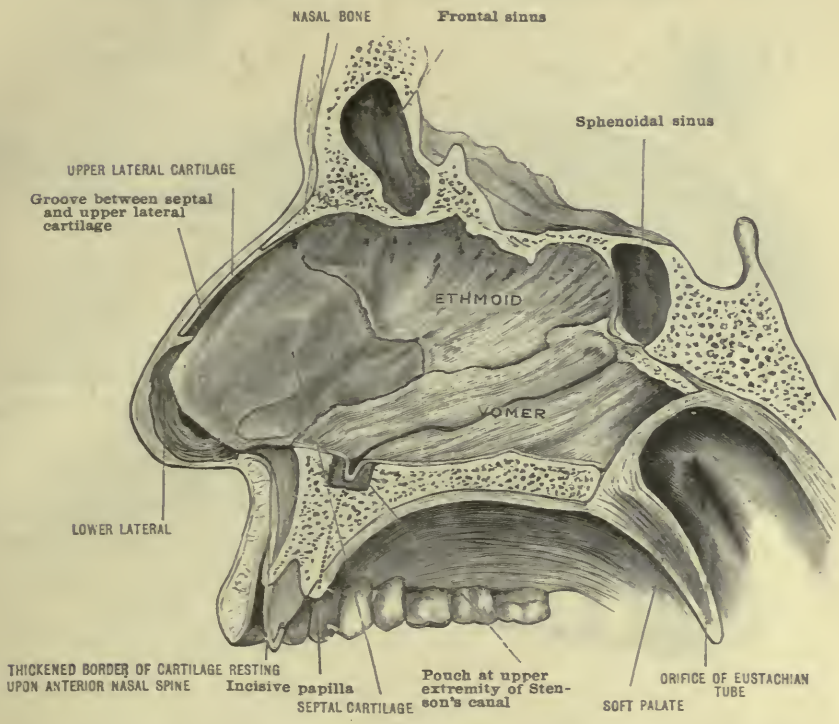


FIG. 65.—SECTION OF THE NOSE, SHOWING THE TURBINAL BONES AND MEATUSES, WITH THE OPENINGS IN DOTTED OUTLINE.—(*Morris.*)

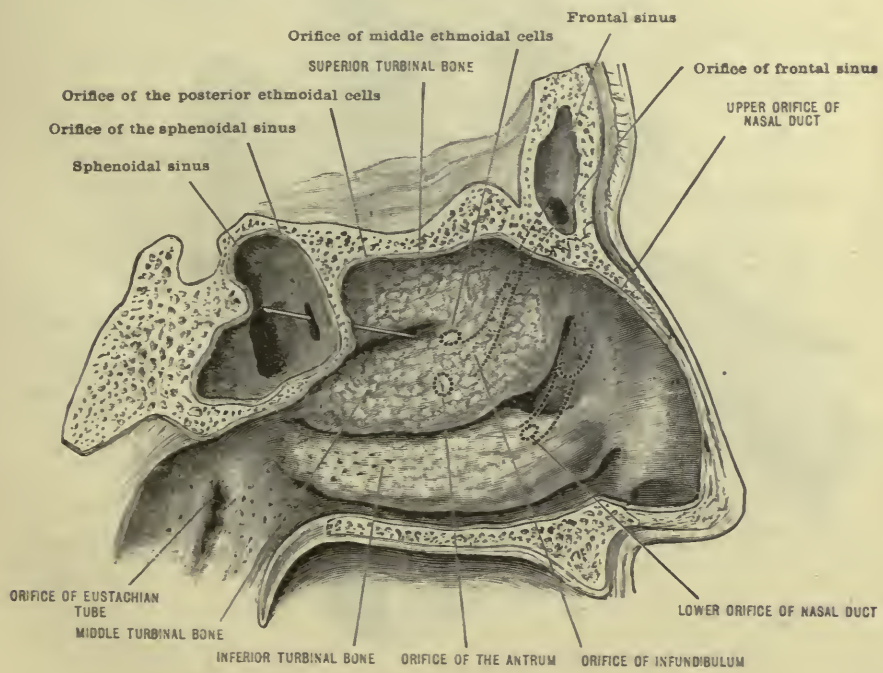


FIG. 66.—NERVES OF THE NASAL CAVITY.—(*Morris.*)

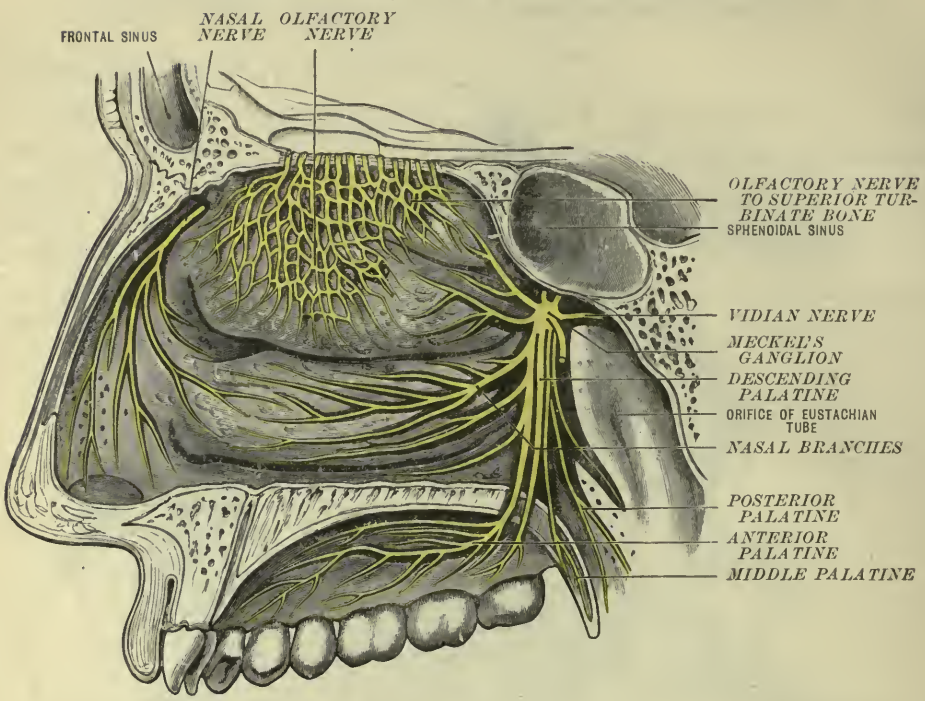
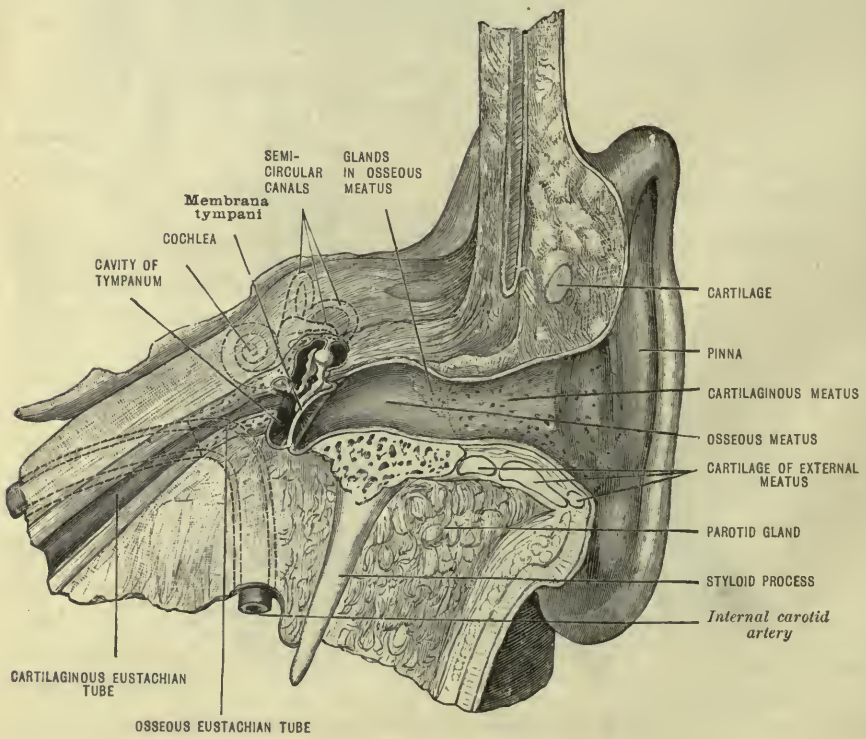


FIG. 67.—SECTION OF THE MIDDLE AND EXTERNAL EAR.—(*Morris.*)



EAR.

External ear. (Fig. 67.)

Pinna or auricle.

Integument.

Cartilage.

Ligaments.

Muscles.

External auditory meatus.

Cartilaginous portion.

Osseous portion.

Skin.

Middle ear or tympanum.

Tympanic Cavity.—This is best opened for inspection by removing its roof or tegmen tympani. Make an opening through the tegmen tympani external to the elevation formed by the superior semicircular canal. Remove the whole roof of the tympanic cavity, and study its **ossicles, walls, mastoid antrum, attic, and Eustachian tube.**

Internal ear or labyrinth.

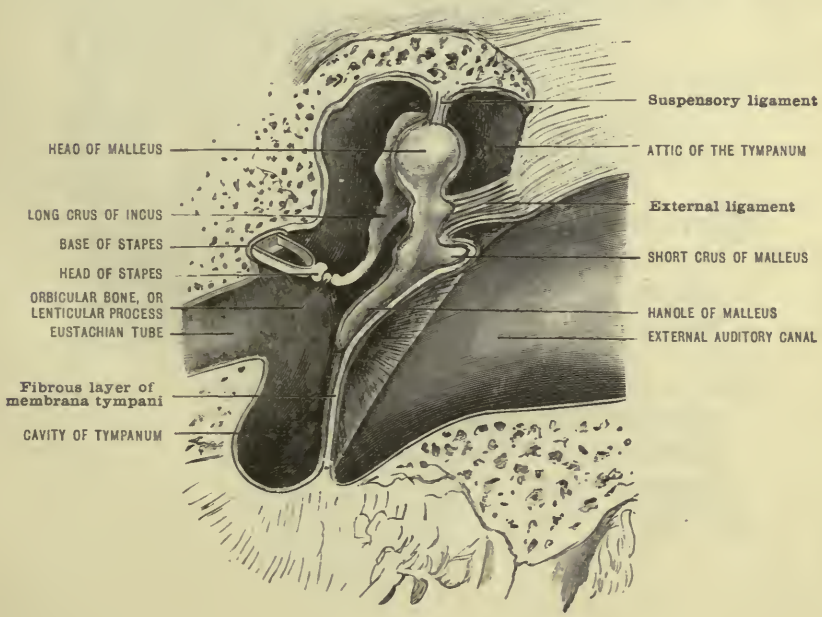
Osseous labyrinth.

Vestibule.

Semicircular canals.

Cochlea.

FIG. 68.—SECTION OF THE TYMPANUM, ETC. Enlarged.—(*Morris.*)



DEMONSTRATION XI.

BACK.

Place the cadaver in a prone position. Note the vertebral spines. Support the chest with a block so as to make the muscles tense.

Dissection: Make an incision along the middle line of the back from the occiput down. Turn the skin outward with care so as not to destroy all of the posterior primary divisions of nerves. (Fig. 69.)

Posterior primary nerves:—
- Cervical.
  - Internal branches.
  - External branches.
- First cervical.
- Second cervical.
  - Internal branch or **Great Occipital.**
- Third cervical.
  - Small occipital.
- Fourth, fifth, sixth, seventh and eighth cervical.
- Dorsal.
  - Internal branches.
  - External branches.
  - Lumbar branches.

Study superficial and deep fascia of the back.
Expose and study the following:—

Muscles:

First layer. (Fig. 70.)
- Trapezius.
- Latissimus dorsi.

Second layer. (Fig. 71.)
- Levator anguli scapulæ.
- Rhomboideus minor.
- Rhomboideus major.

Third layer. (Fig. 72.)
- Serratus posticus superior.
- Serratus posticus inferior.
- Splenius capitis colli.

FIG. 69.—DISTRIBUTION OF THE POSTERIOR PRIMARY DIVISIONS OF THE SPINAL NERVES. (Henle.) (*Morris.*)

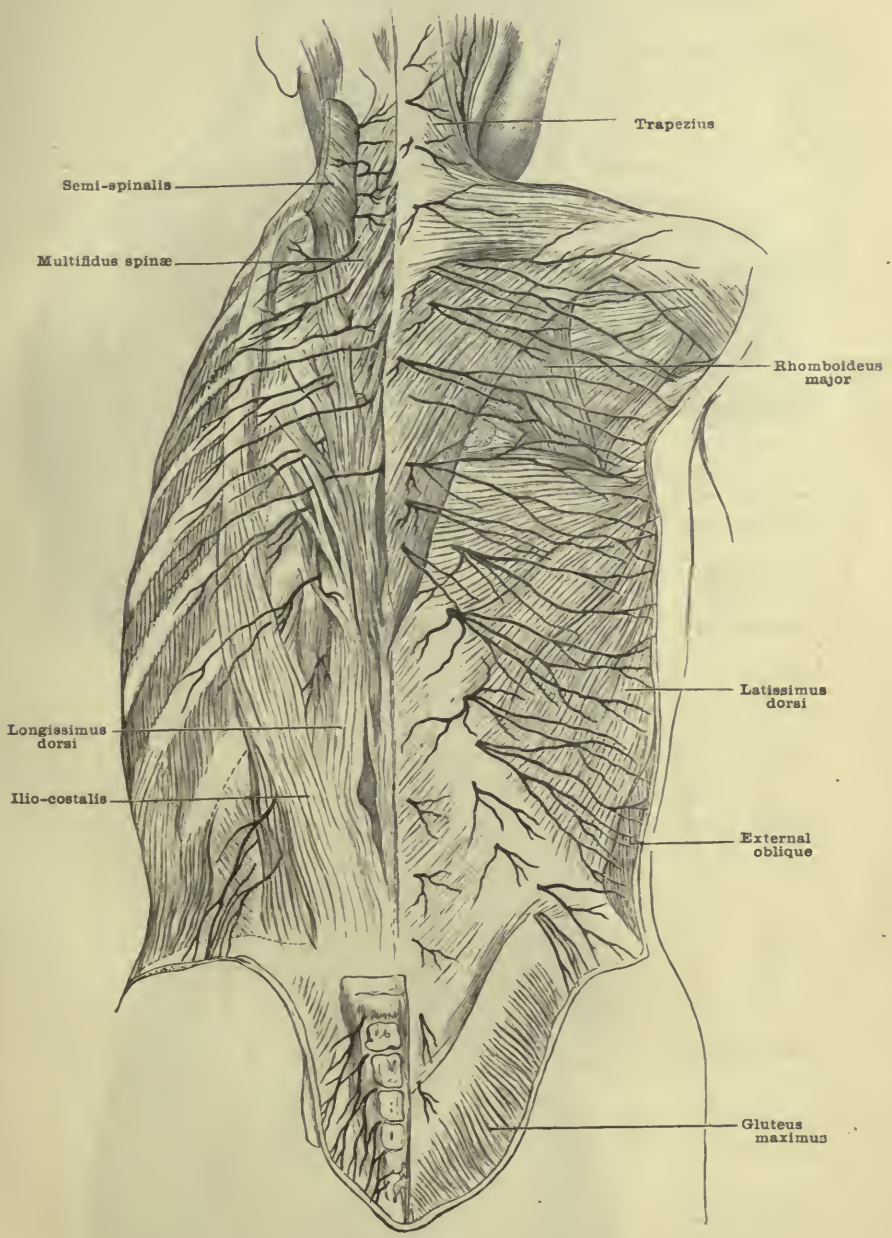


FIG. 70.—FIRST LAYER OF MUSCLES OF THE BACK.—(*Morris.*)

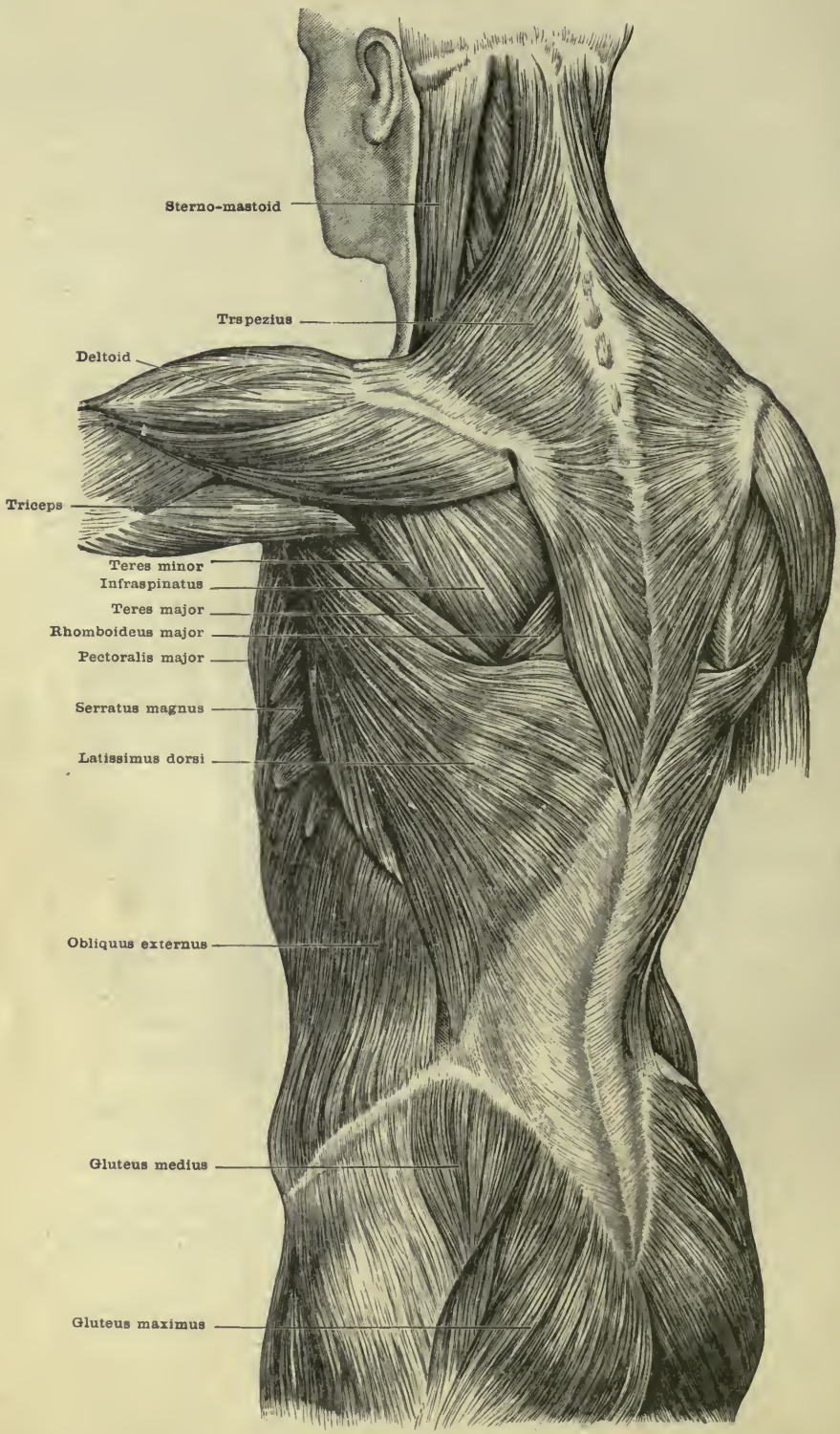


FIG. 71.—THE LEVATOR ANGULI SCAPULÆ AND RHOMBOIDEI.—(*Morris.*)

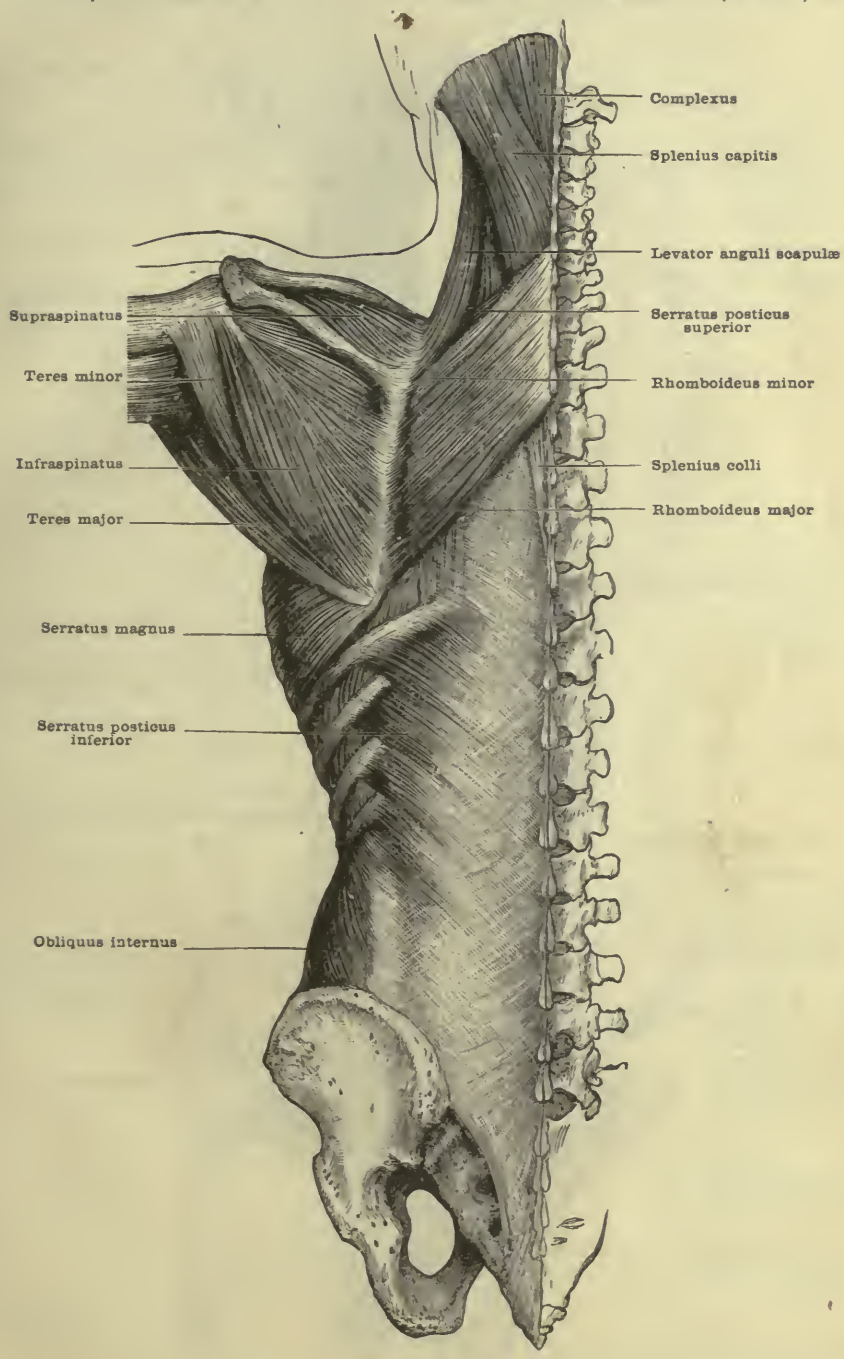


FIG. 72.—THE THIRD AND FOURTH LAYERS OF THE MUSCLES OF THE BACK.—(*Morris.*)

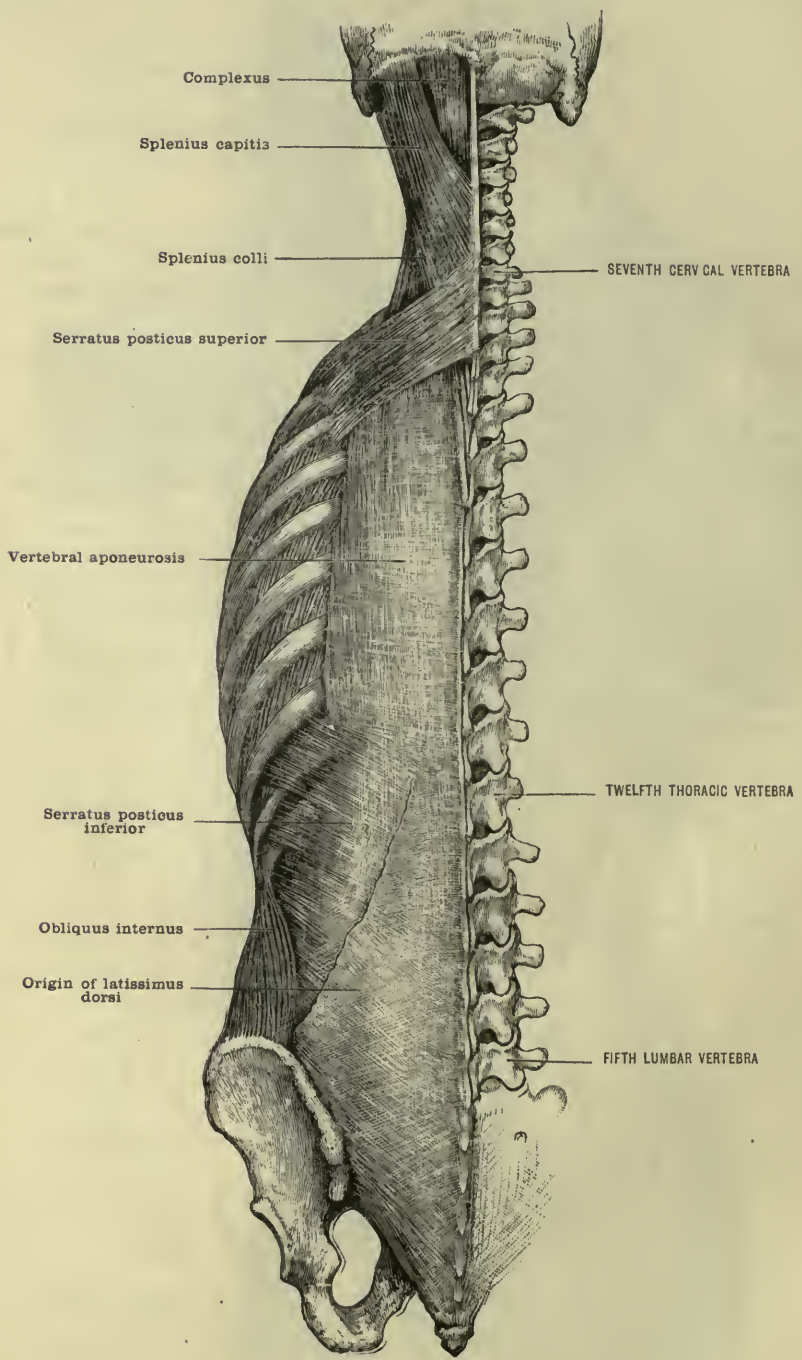


FIG. 73.—SCHEME OF INTERCOSTAL ARTERY. (Walsham.) (*Morris.*)

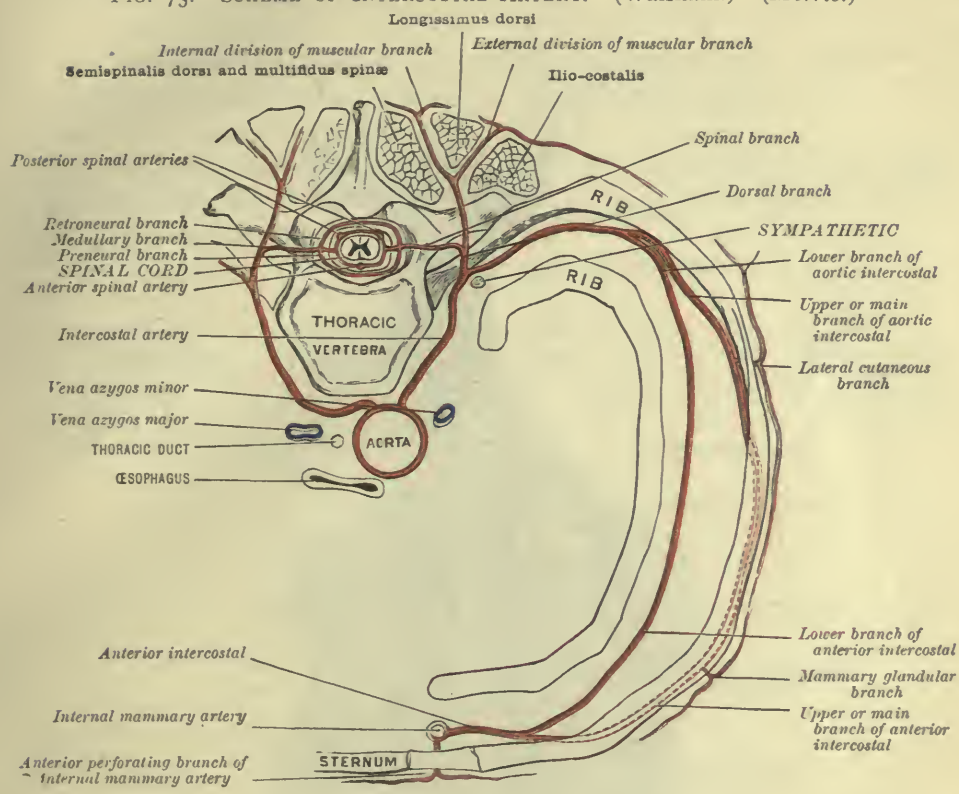


FIG. 74.—SCHEME OF ANASTOMOSES OF THE RIGHT SCAPULAR ARTERIES. (Walsham.) (*Morris.*)

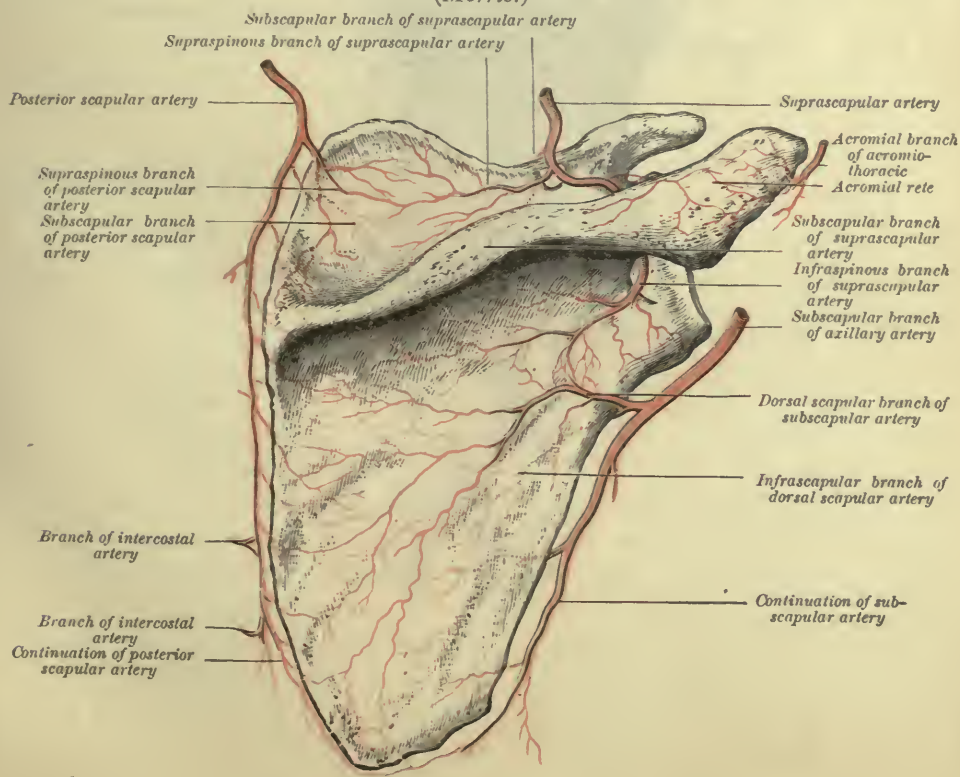
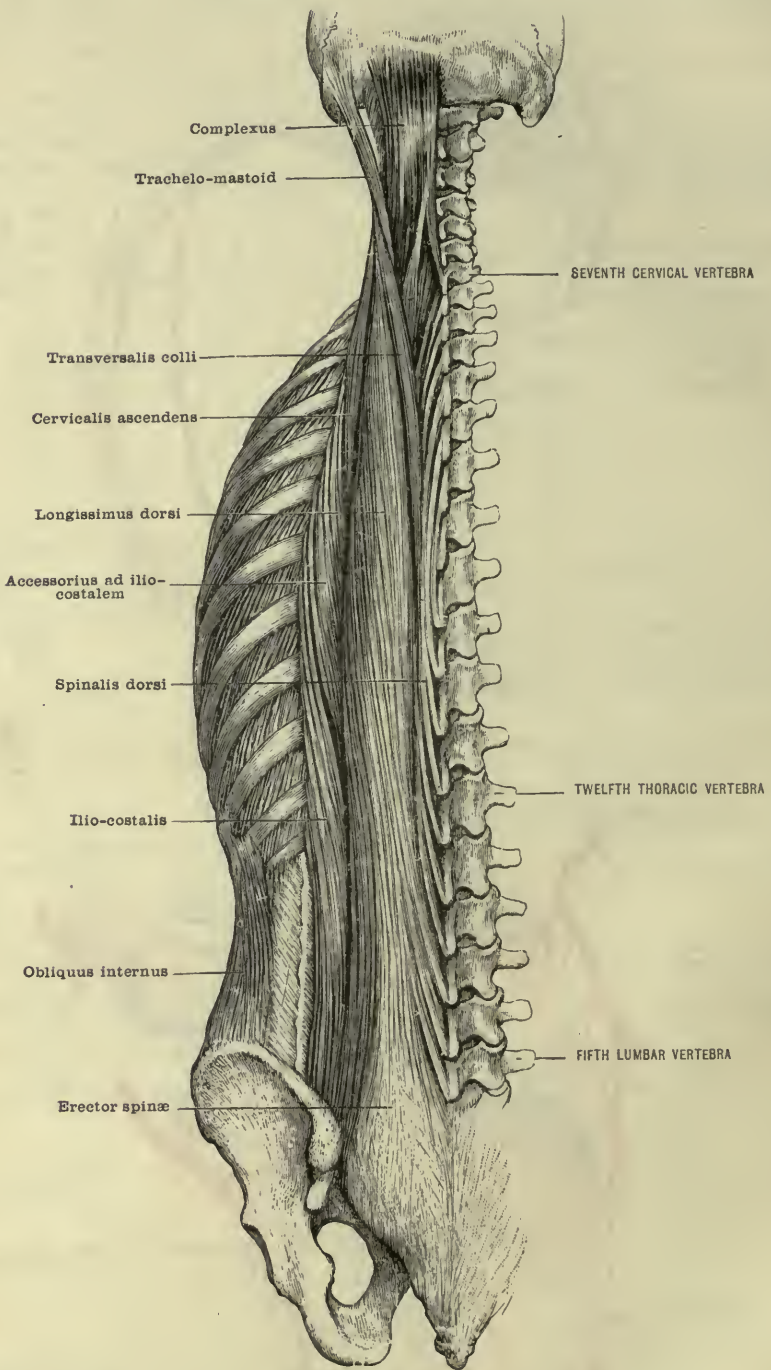

Subscapular branch of suprascapular artery
Supraspinous branch of suprascapular artery
Posterior scapular artery
Suprascapular artery
Acromial branch of acromio-thoracic
Supraspinous branch of posterior scapular artery
Acromial rete
Subscapular branch of posterior scapular artery
Subscapular branch of suprascapular artery
Infraspinous branch of suprascapular artery
Subscapular branch of axillary artery
Dorsal scapular branch of subscapular artery
Infrascapular branch of dorsal scapular artery
Branch of intercostal artery
Continuation of sub-scapular artery
Branch of intercostal artery
Continuation of posterior scapular artery

FIG. 75.—THE FIFTH LAYER OF THE MUSCLES OF THE BACK.—(*Morris.*)



Arteries (Figs. 73 and 74):—

Intercostals.

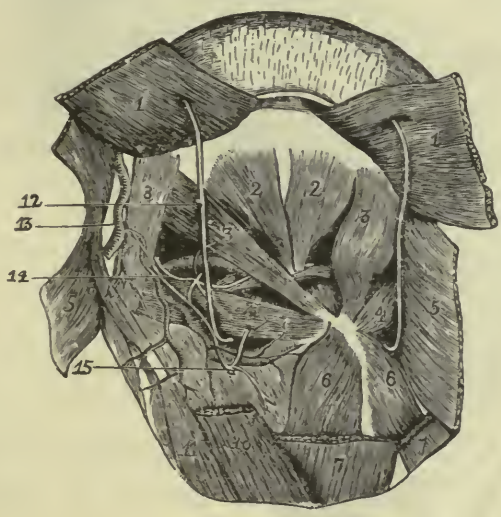
Posterior scapular.

Expose and study the erector spinæ muscle. (Fig. 75.)

Study the vertebral aponeurosis.

The remaining muscles of the back, except the muscles of the suboccipital triangle, need not be dissected out. The names of the muscles should, however, be remembered.

FIG. 76.—DRAWING FROM NATURE, OF THE SUBOCCIPITAL TRIANGLE.—(*Holden.*)
1 and 7. Complexus. 2. Rectus cap. posticus minor. 3. Rectus cap. posticus major. 4. Obliquus inferior. 5. Sternomastoid. 6. Semispinalis colli. 8. Obliquus superior. 10. Splenius. 11. Trachelo-mastoid. 12. Great occipital nerve. 13. Occipital artery giving off its descending branch—the *princeps cervicis*. 14. Suboccipital nerve. 15. Third cervical nerve (posterior branch).



SUBOCCIPITAL TRIANGLE.

Muscles:—

Rectus capitis posticus major.

Rectus capitis posticus minor.

Obliquus capitis inferior.

Obliquus capitis superior.

Nerves:—

First cervical (*suboccipitalis*).

Second cervical.

Great occipital.

Arteries:—

Vertebral. (See Fig. 49.)

Occipital.

Princeps cervicis.

Deep cervical.

DEMONSTRATION XII.

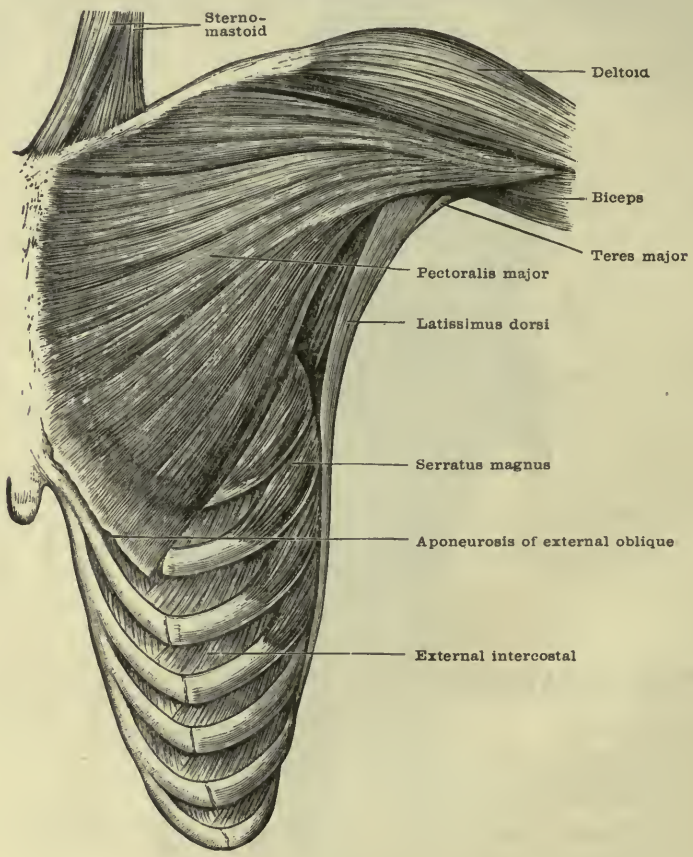
PECTORAL AND AXILLARY REGION.

Examine in the articulated skeleton the position of the following:—

Clavicle. Sternum.
Scapula and processes.
Shoulder joint.
Ribs. Costal cartilages.

Outline position of the heart. (Fig. 85.)

FIG. 77.—THE PECTORALIS MAJOR AND DELTOID.—(*Morris.*)



Place the cadaver upon its back, draw the arm out to a right angle with the trunk, then make a vertical incision through the skin in the median line from the upper to the lower part of the sternum; a second incision from the ensiform cartilage along the inner fold of the axilla to the deltoid muscle; a third incision from the middle of the clavicle along the anterior part of the upper third of the arm. Remove the skin from the pectoral region, turn it outward from the upper arm, outward and backward from the axilla.

Note and study the superficial fascia, pectoral fascia, clavi-pectoral fascia, costo-coracoid membrane, and axillary fascia.

Study superficial nerves. (See Fig. 81.)

Study mammary gland.

Study the lymphatics of the thorax, upper extremity, and axilla.

Expose and study the **pectoralis major muscle.** (Fig. 77.)

Detach this muscle from its origin and turn it outward. See the anterior thoracic nerves as they enter the muscle on the posterior surface.

Clean and study the **pectoralis minor muscle.** (See Fig. 78.)

Detach this muscle from its origin and turn it outward.

Clean and study the **subclavius muscle.** (See Fig. 79.)

Clean and study:—

Nerves:—

- Anterior thoracic.
  - External.
  - Internal.
- Dorsal. (Fig. 80.)
  - Anterior primary divisions.
    - Lateral.
    - Anterior.
  - Intercosto-humeral (Fig. 81)—*this lateral branch of the second dorsal passes out from the second intercostal space to the arm.*

Expose the brachial plexus and notice the relation the cord and larger branches bear to the blood-vessels. (Figs. 94, 98, 100.)

Arteries:—

- Perforating branches of internal mammary. (Fig. 82.)
- Axillary and branches. (See Fig. 83.)

Veins:—

- Axillary and tributaries.

Expose and study the **serratus magnus muscle** (*M. serratus anterior*). (Fig. 84.)

Review carefully the lymphatic nodes and afferent and efferent vessels of the axilla.

When all the structures in the axilla are exposed study their relative positions to each other and to surrounding parts.

FIG. 78.—THE PECTORALIS MINOR, OBLIQUUS INTERNUS, PYRAMIDALIS, AND RECTUS ABDOMINIS.—(*Morris.*)

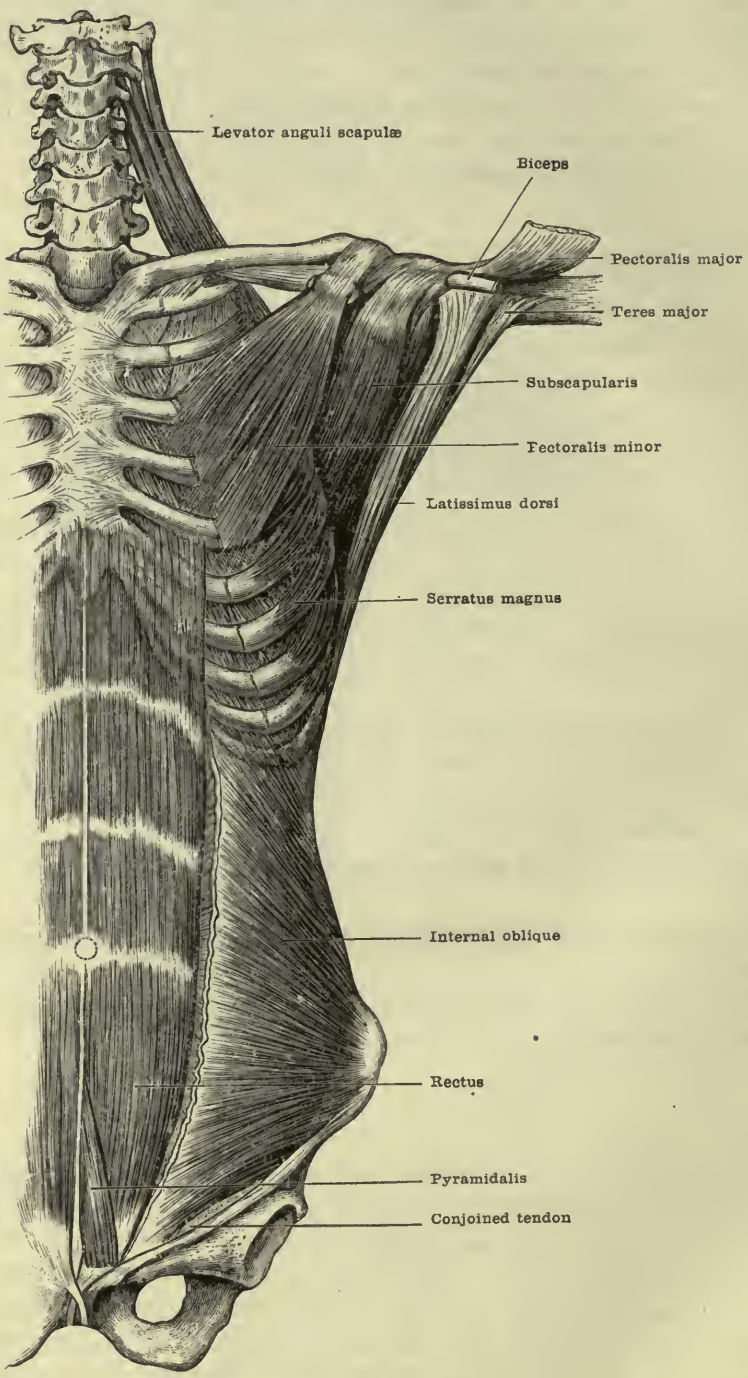


FIG. 79.—THE SUBCLAVIUS AND THE UPPER PORTION OF THE SERRATUS MAGNUS.—(*Morris.*)

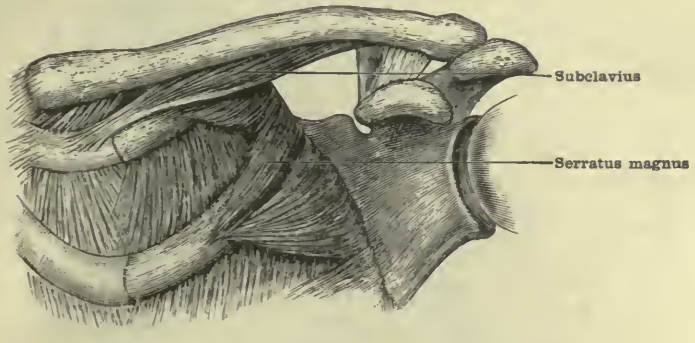


FIG. 80.—DIAGRAM OF THE DISTRIBUTION OF A TYPICAL DORSAL NERVE.—(*Morris.*)

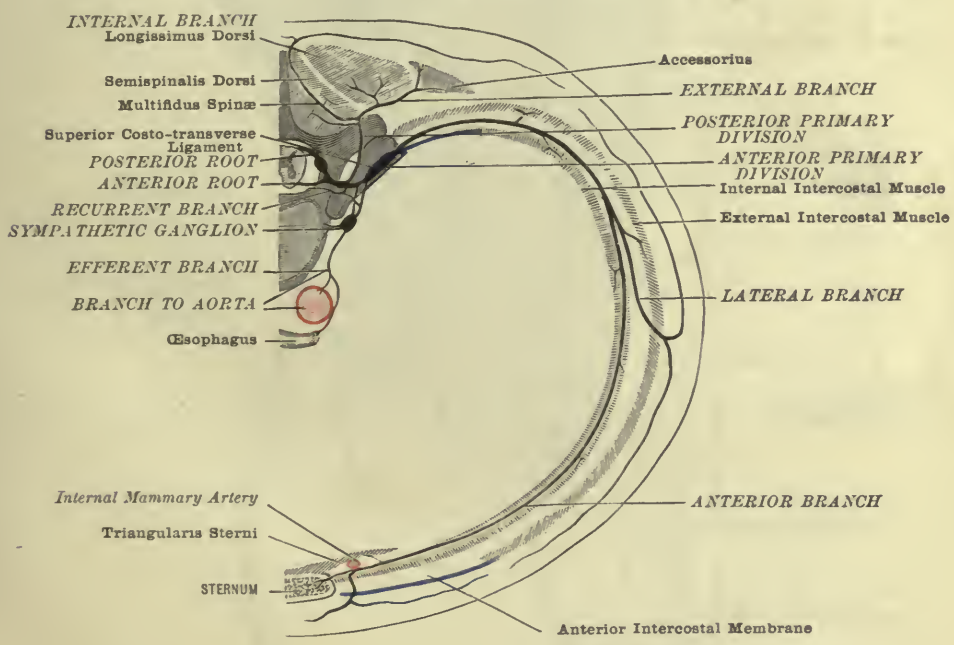


FIG. 81.—CUTANEOUS NERVES OF THE THORAX AND ABDOMEN, VIEWED FROM THE SIDE. (After Henle.) (*Morris.*)

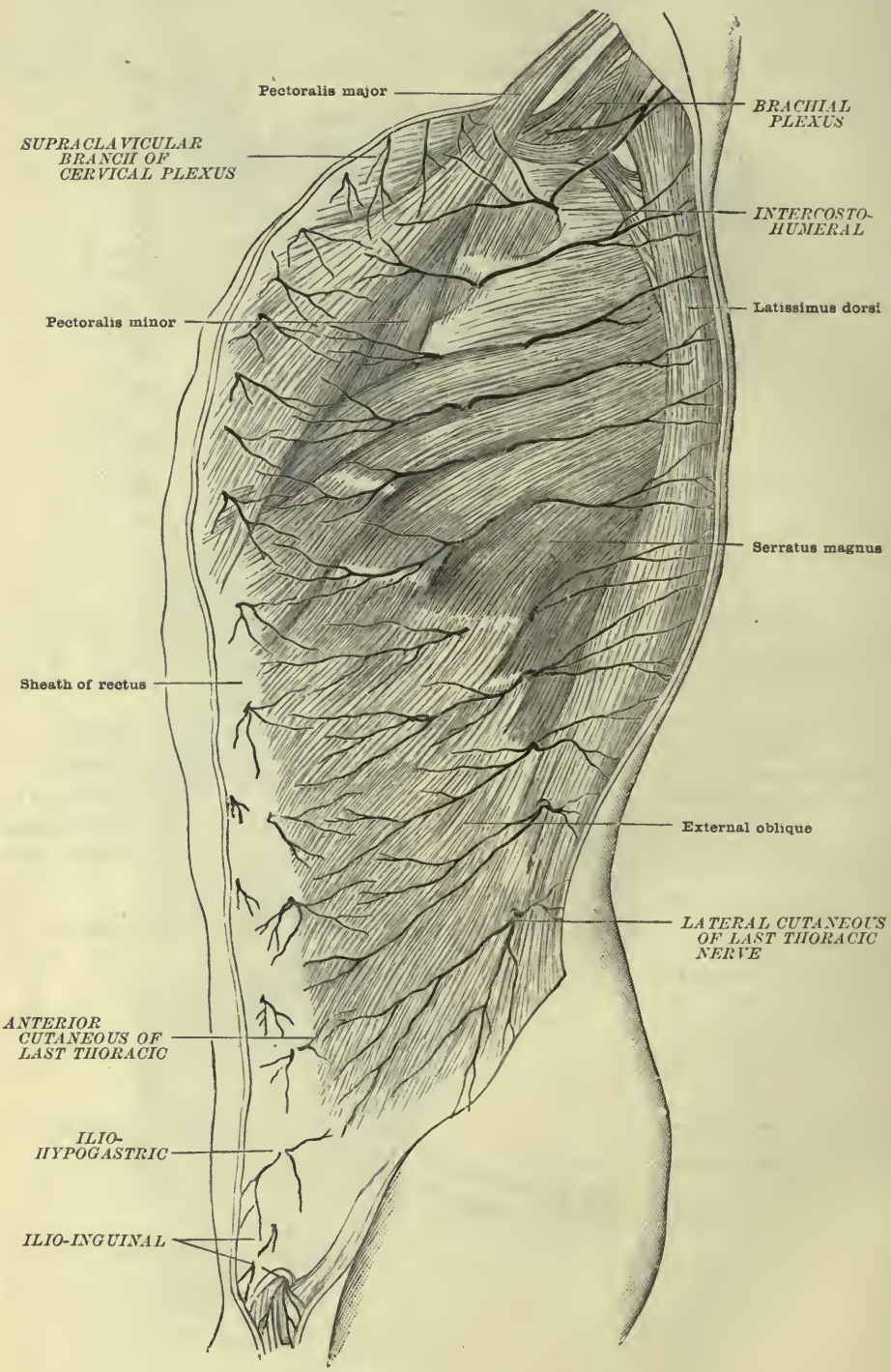


FIG. 82.—SCHEME OF THE RIGHT INTERNAL MAMMARY ARTERY.—(Walsham.) (*Morris.*)

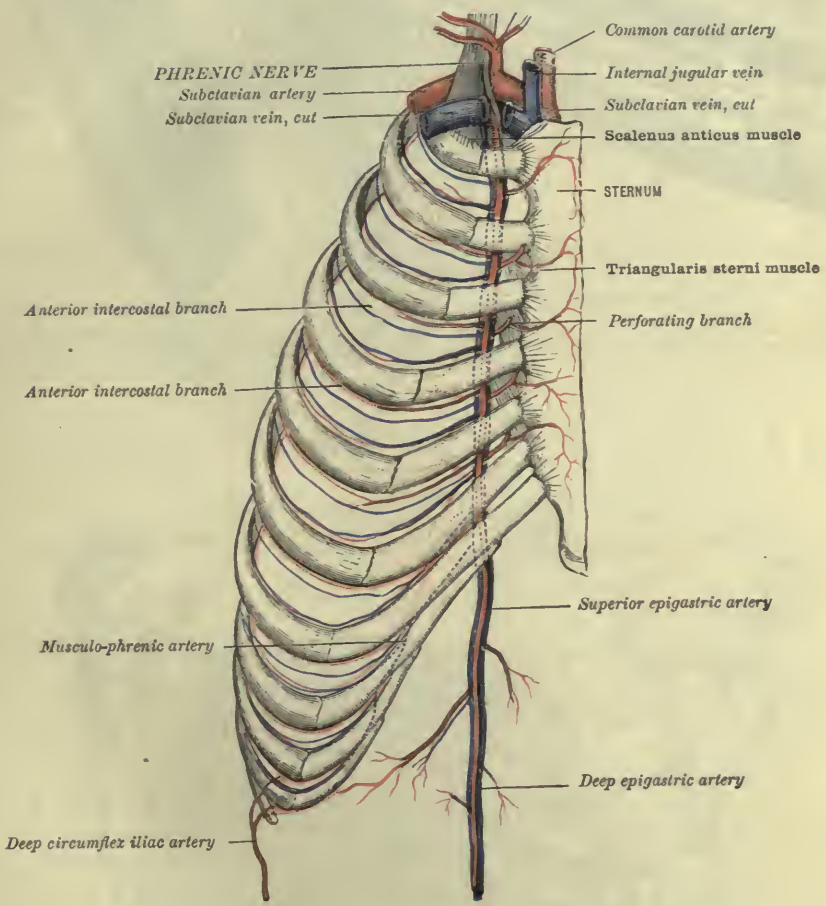


FIG. 83.—DIAGRAM OF AXILLA.—(*Holden.*)

1. Axillary artery. 2. Brachial artery. 3. Thoracica humeraria artery. 4. Superior thoracic artery. 5. Subscapular artery. 6. Dorsalis scapulæ artery. 7. Posterior circumflex artery. 8. Superior profunda artery. 9. Posterior thoracic nerve. 10. Long subscapular nerve. 11. Median nerve. 12. Cephalic vein. 13. Musculo-cutaneous nerve. 14. Teres major.

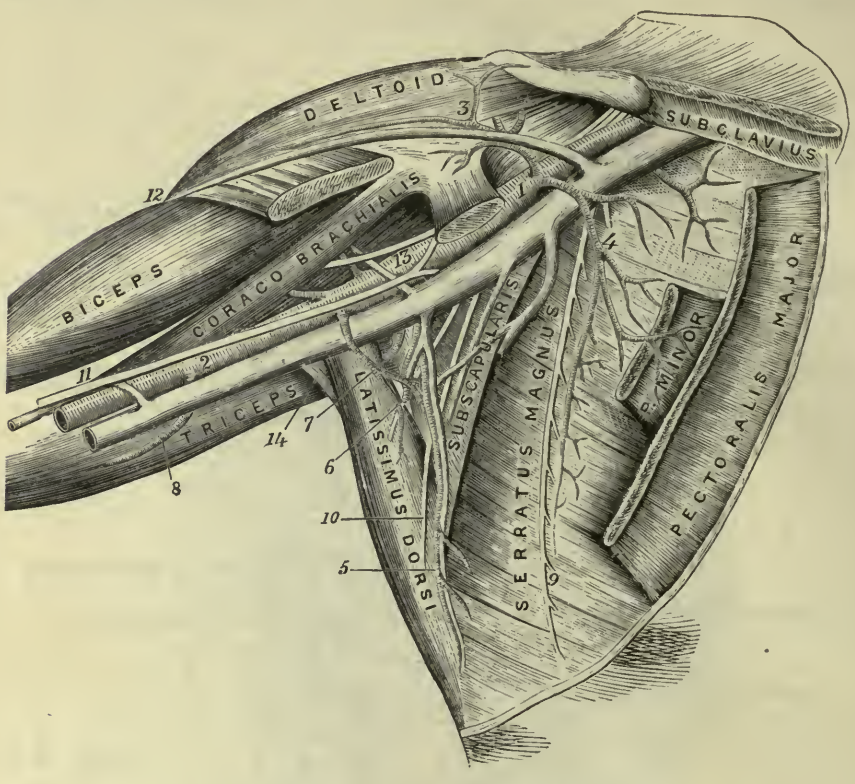
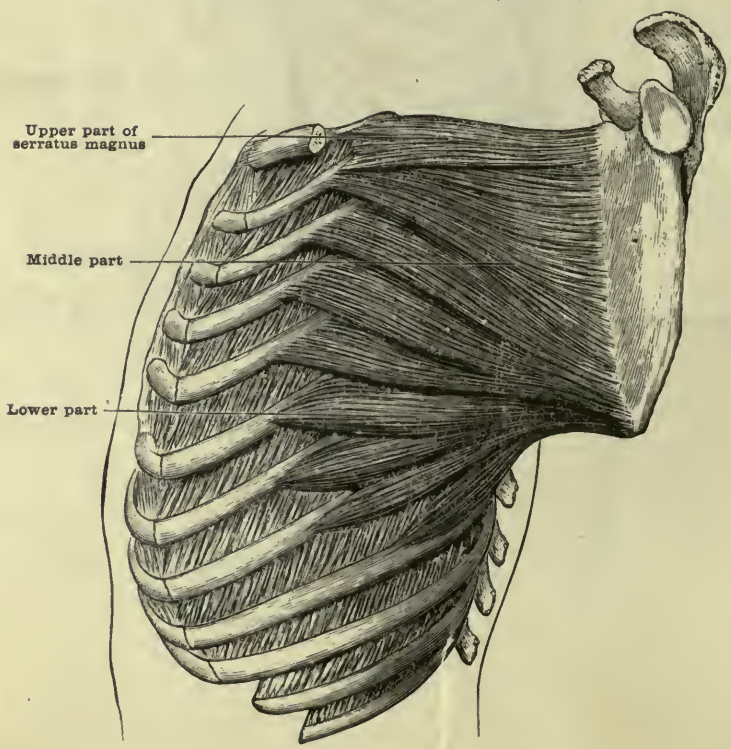


FIG. 84.—SERRATUS MAGNUS.—(*Morris.*)



DEMONSTRATION XIII.

THORAX AND THORACIC VISCERA.

Study the thorax in the articulated skeleton. Note:—

Cavity of thorax.

Superior aperture.

Inferior aperture.

Costal arches.

Intercostal spaces.

Locate the position of heart and its valves.

Now cut the costal cartilages where they join the ribs and remove them with the sternum. Do this with care so as not to destroy the structures beneath.

Note and study **internal mammary artery and branches.** (See Fig. 82.)

FIG. 85.—SHOWING THE POSITION OF THE HEART AND ITS VALVES IN RELATION TO THE CHEST WALLS.—(*Morris.*)

(Reduced from Hensman and Fisher's Anatomical Outlines.)

(The right auricle and ventricle, with the pulmonary semilunar and tricuspid valves, are outlined in blue tints; whilst the left auricle and ventricle, with their corresponding valves, are indicated in red.)

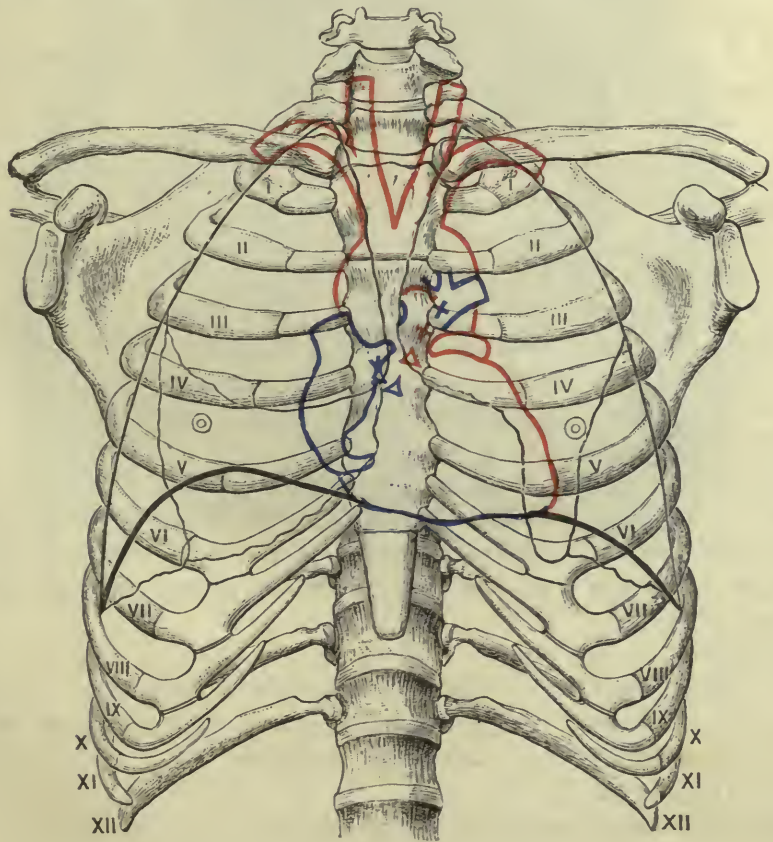
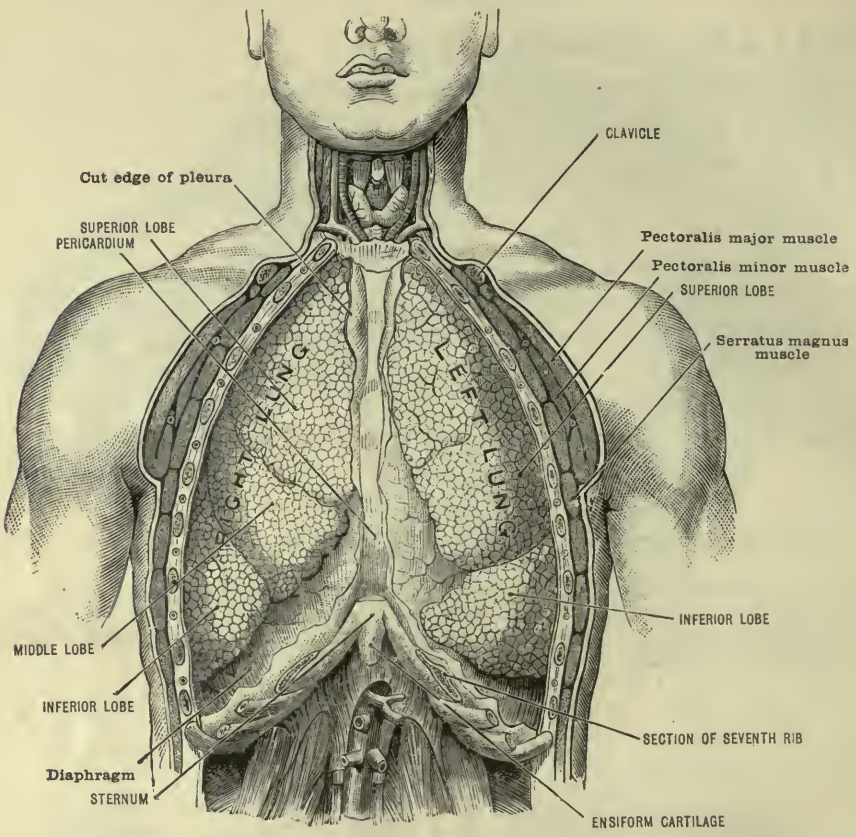


FIG. 86.—ANTERIOR VIEW OF THE THORAX WITH CHEST WALL REMOVED, SHOWING THE LUNGS. (Modified from Bourgery.) (*Morris.*)



Trace as far as possible and study the pericardium.

Trace as far as possible and study the pleura.

Mediastinal space. What is it?

Study the thymus gland. (See Fig. 35.)

Study the position and relation of the heart, large blood-vessels, lungs, trachea, bronchi, and œsophagus. (Figs. 87, 88, 92.)

Trace the phrenic nerve down between the pericardium and pleura. (Fig. 88.)

Trace the vagus nerve down to the pulmonary plexus. (Figs. 88 and 89.)

Remove the heart and lungs. Cut the arch of the aorta just beyond the origin of the left subclavian artery. Cut the pericardium from the diaphragm. Lay the heart and lungs aside and dissect out and study the following:

Muscles:—

Intercostal.	Infracostalis (*Mm. subcostales*).
External.	Triangularis sterni (*M. transversus thoracis*).
Internal.	Levatores costarum.
Diaphragm.	

Dorsal, or intercostal nerves. (See Fig. 80.)

FIG. 87.—ANTERIOR VIEW OF THE LUNGS; PERICARDIUM. (Modified from Bourgery.) (*Morris.*)

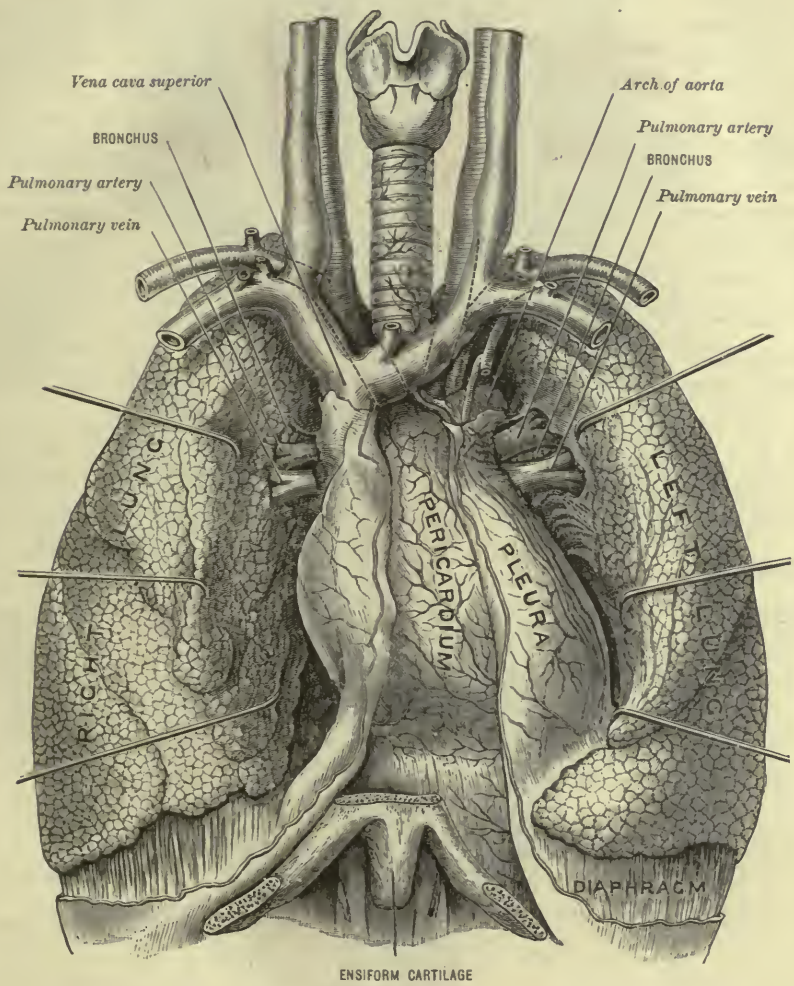


FIG. 88.—THE ARCH OF THE AORTA, WITH THE PULMONARY ARTERY AND CHIEF BRANCHES OF THE AORTA.—(*Morris.*). Also see Fig. 96.

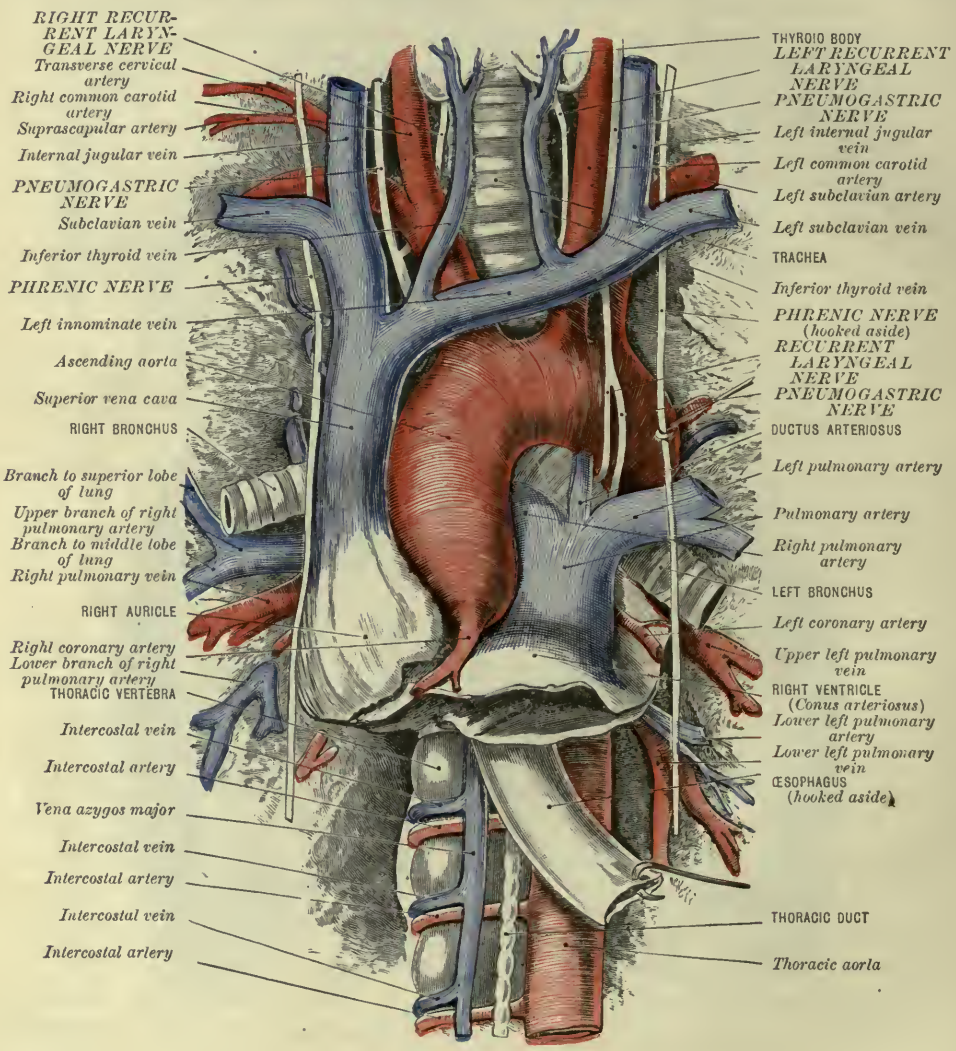


FIG. 89.—THE CERVICAL PORTION OF THE SYMPATHETIC AND THE DISTRIBUTION OF THE PNEUMOGASTRIC NERVE, VIEWED FROM BEHIND. (Krause.) (*Morris.*) Also see Fig. 88.

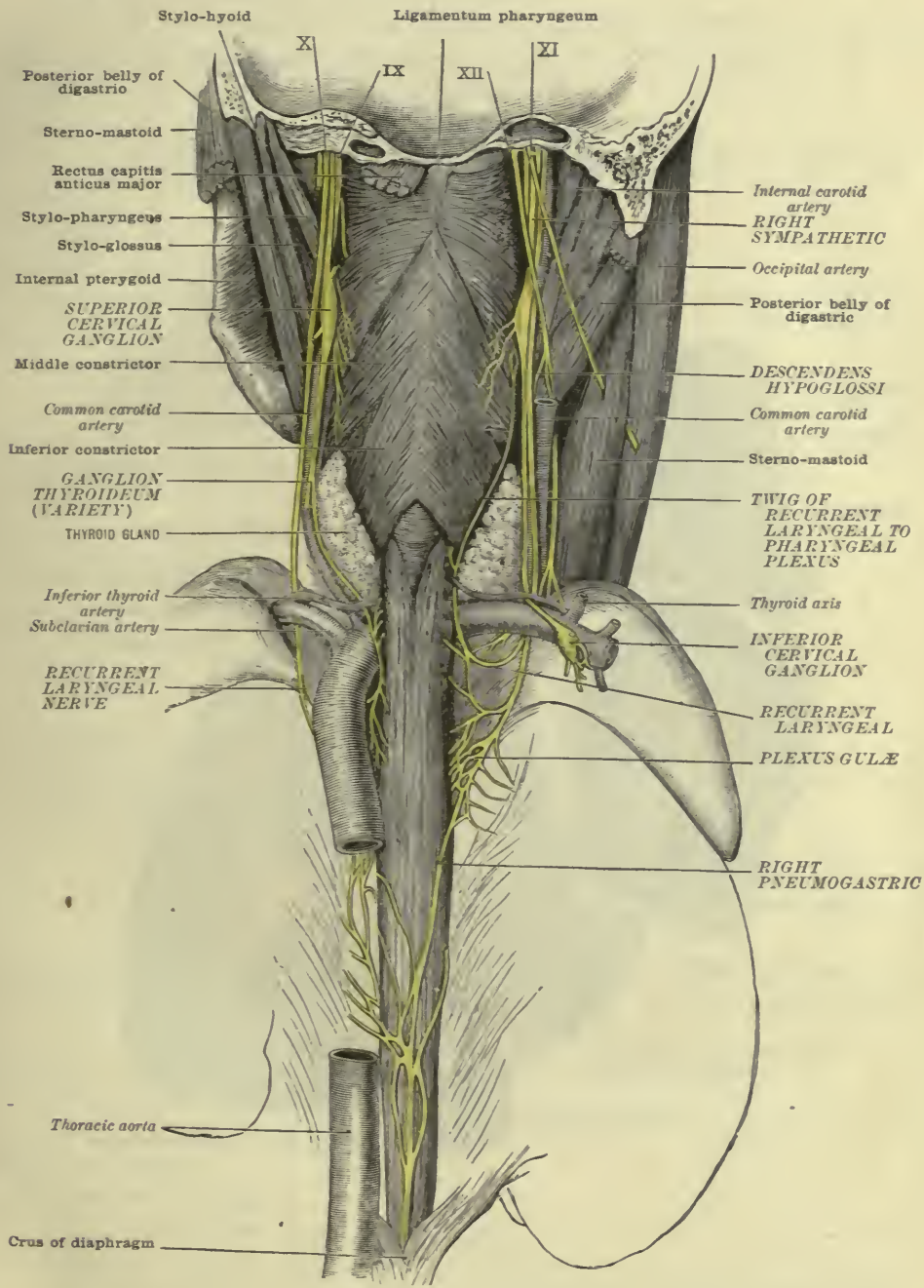
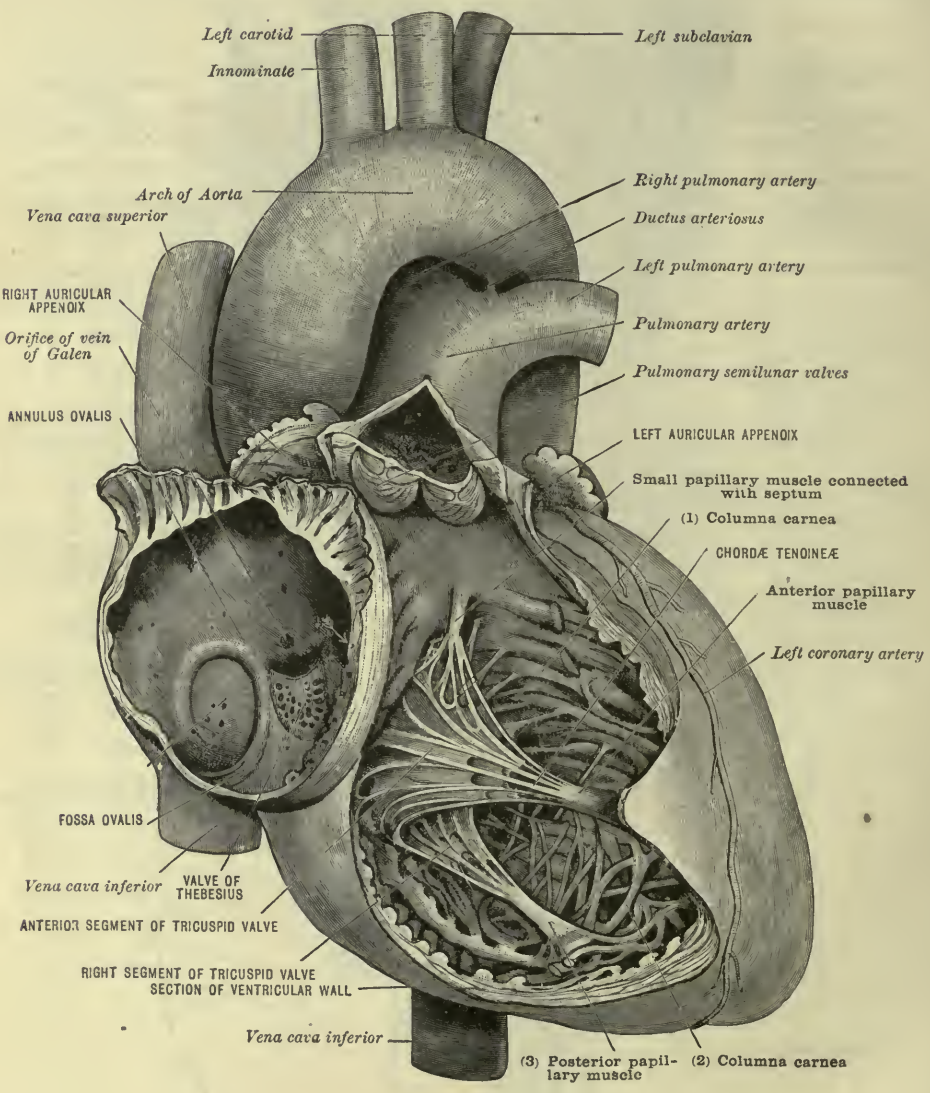


FIG. 90.—ANTERIOR VIEW OF THE RIGHT CHAMBERS OF THE HEART, WITH THE GREAT VESSELS.—(*Morris.*)



HEART.

Study the heart:—
- Position.
- Size and weight.
- Auriculo-ventricular groove.
- Interventricular groove or coronary sulcus.
- Coronary arteries.

Dissect the heart. Make an incision as shown in figure 90.

Also make a dissection of the heart of an ox or sheep.

Examine and study carefully the whole of the exterior and interior of the heart.

What is its nerve- and blood-supply?

Study the fœtal heart and fœtal circulation. (Fig. 91.)

Expose and study pulmonary arteries and pulmonary veins. (See Figs. 87 and 88.)

Expose and study:—

Aorta (See Figs. 90, 92):—

Branches of arch:—
- Coronary.
- Innominate.
- Left common carotid.
- Left subclavian.
- Thyroidea ima.

Branches of descending aorta in thorax.
- Pericardiac.
- Bronchial.
- Œsophageal.
- Intercostal.
- Diaphragmatic.

Superior intercostal artery. (See Fig. 93.)

Veins (See Fig. 88):—
- Innominate right.
- Innominate left.
- Internal mammary.
- Superior intercostal.
- Superior vena cava.
- Azygos and tributaries. (Fig. 92.)
- Spinal veins. (Fig. 94.)

Expose and study thoracic duct. (See Fig. 92.)

Clean and study the thoracic gangliated cord.

LUNGS.

Note the position in the thorax,—upper and lower boundaries. (See Figs. 86 and 87.)

Describe the lungs.

What is the blood- and nerve-supply?

Study the trachea and bronchi. (Fig. 87.)

Note the relation of œsophagus to the trachea. Study œsophagus.

Study the articulations of the ribs with the vertebræ, and the cartilages with the ribs and sternum.

FIG. 91.—THE HEART, WITH THE ARCH OF THE AORTA, THE PULMONARY ARTERY, THE DUCTUS ARTERIOSUS, AND THE VESSELS CONCERNED IN THE FŒTAL CIRCULATION.—(*Morris.*)

(From a preparation of a fœtus in the Museum of St. Bartholomew's Hospital.)

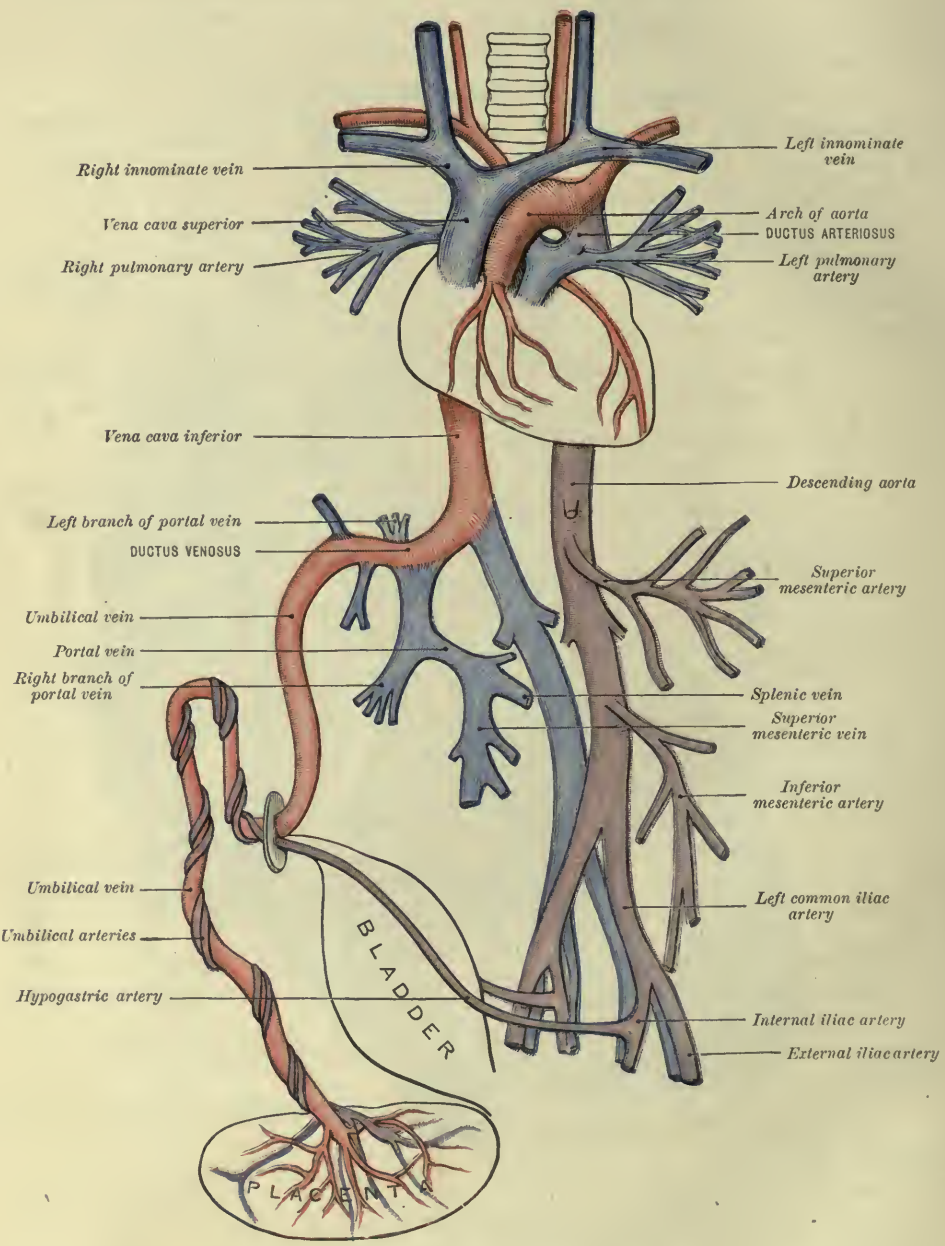


FIG. 92.—THE ARCH OF THE AORTA, THE THORACIC AORTA, AND THE ABDOMINAL AORTA, WITH THE SUPERIOR AND INFERIOR VENA CAVA AND THE INNOMINATE AND AZYGOS VEINS.—(*Morris.*)

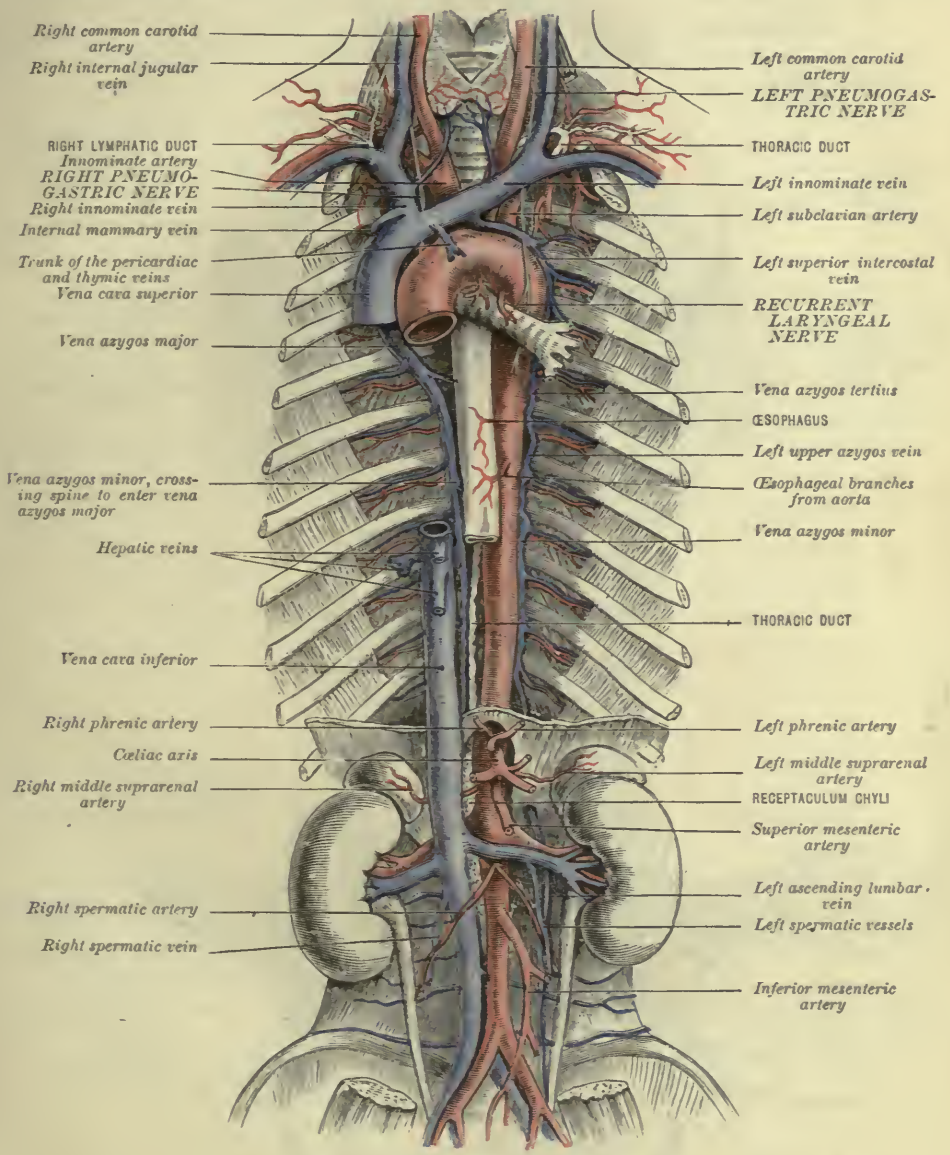


FIG. 93.—SCHEME OF THE RIGHT SUPERIOR INTERCOSTAL ARTERY. (Walsham.) (*Morris.*)

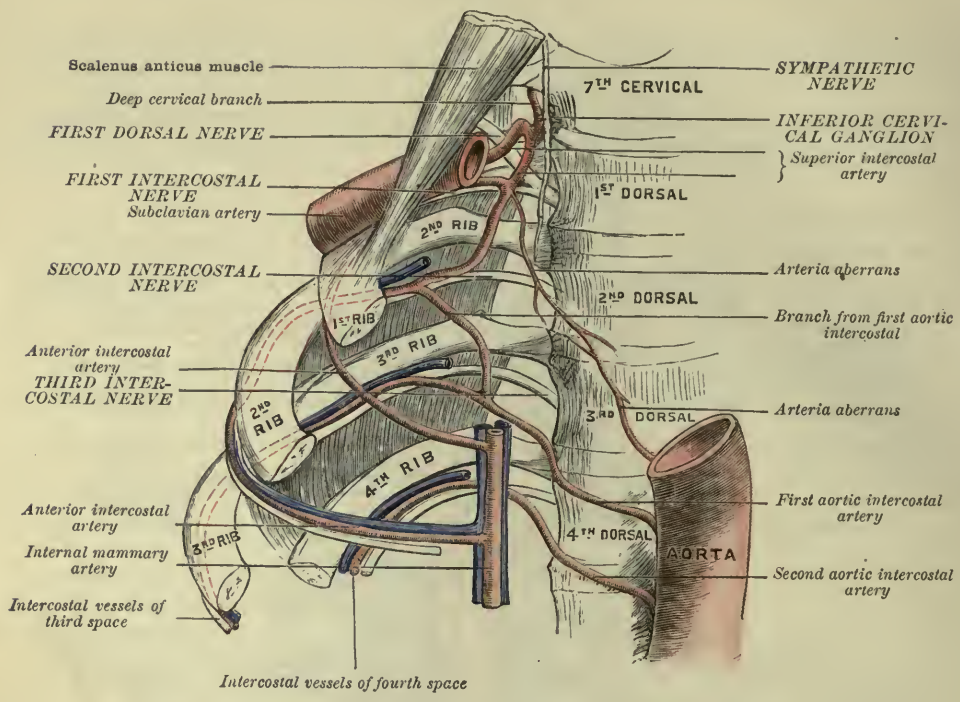
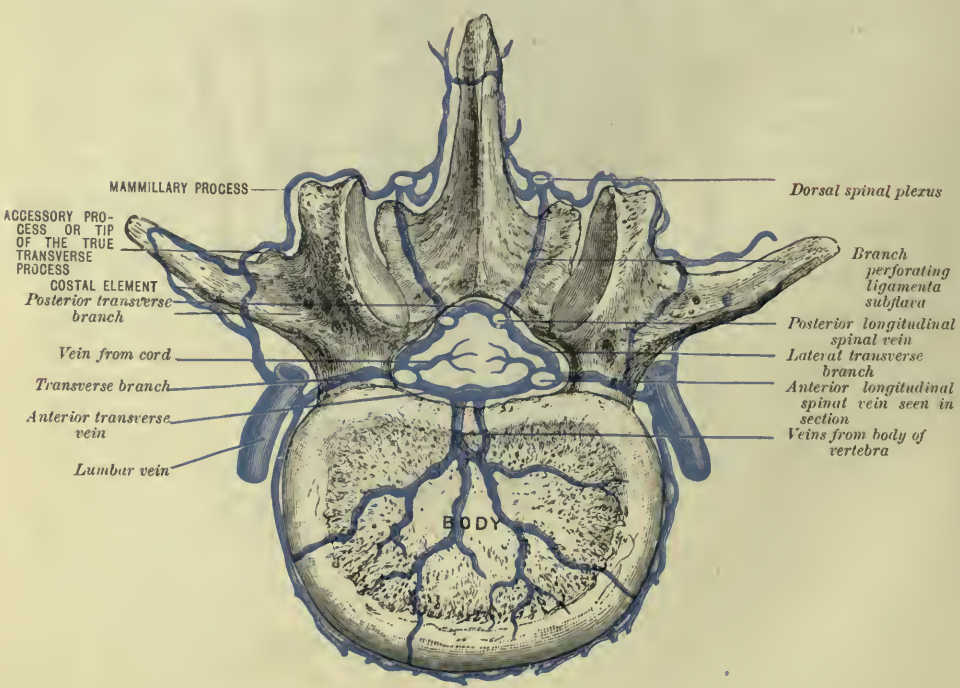


FIG. 94.—THE SPINAL VEINS.—(*Morris.*)



DEMONSTRATION XIV.

SHOULDER AND ARM.

Sever the spinal column above and below the brachial plexus; then saw the piece thus severed through the middle, lengthwise.

FIG. 95.—THE BRACHIAL ARTERY, LEFT SIDE.—(*Morris.*)
(From a dissection in the Museum of the Royal College of Surgeons.)

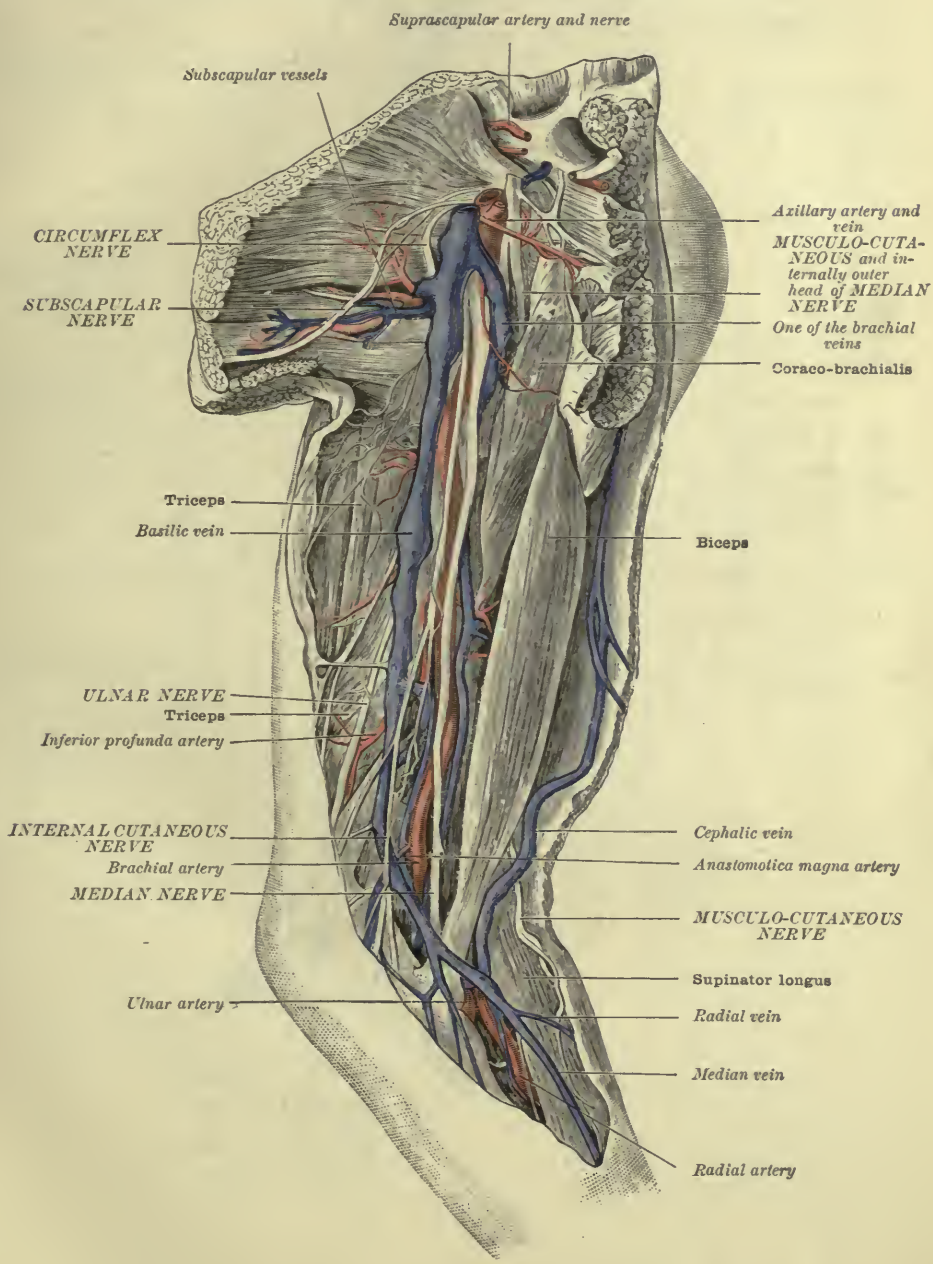
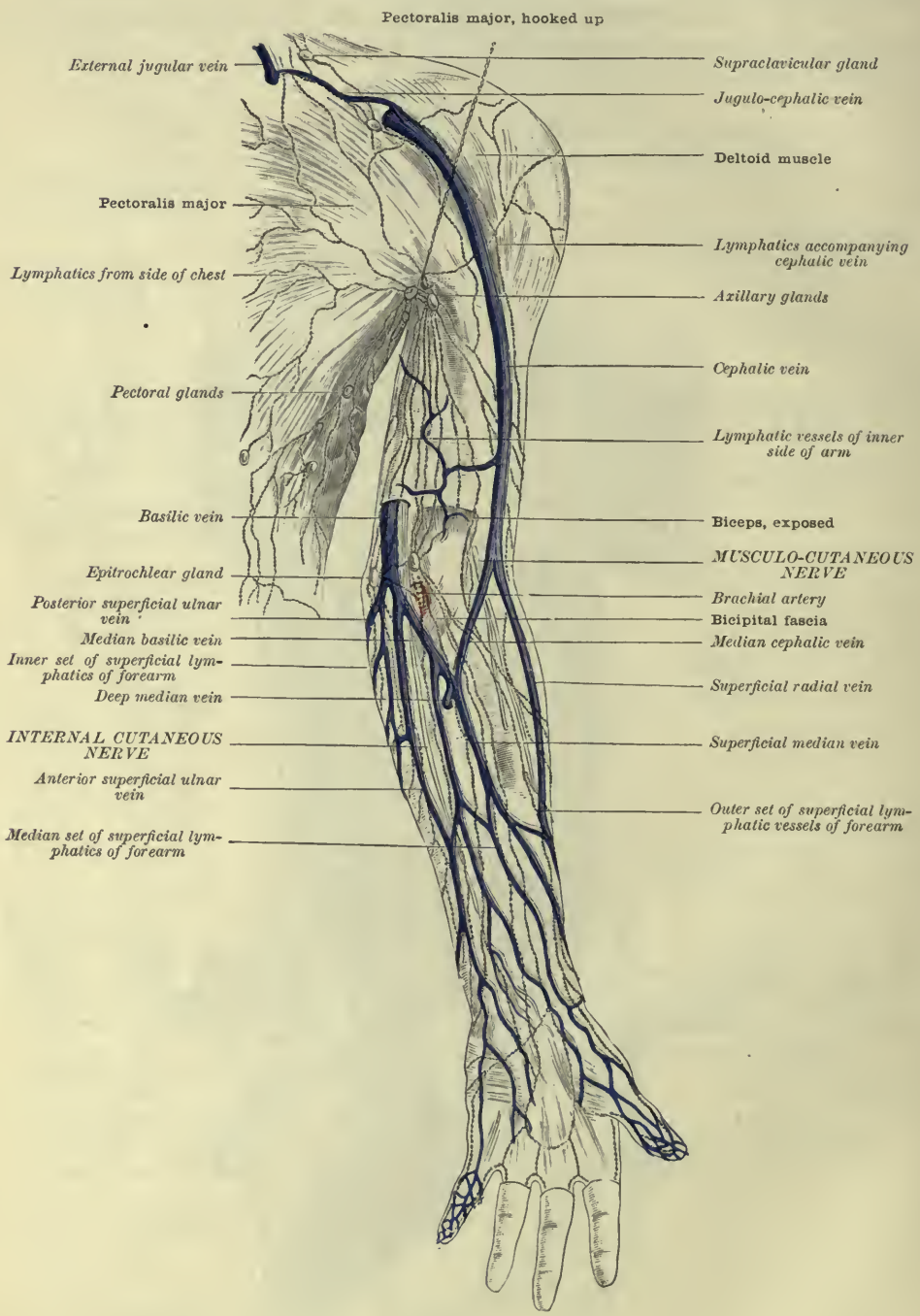


FIG. 96.—SUPERFICIAL VEINS AND LYMPHATICS OF THE LEFT FOREARM AND ARM. (Walsham.) (*Morris.*)



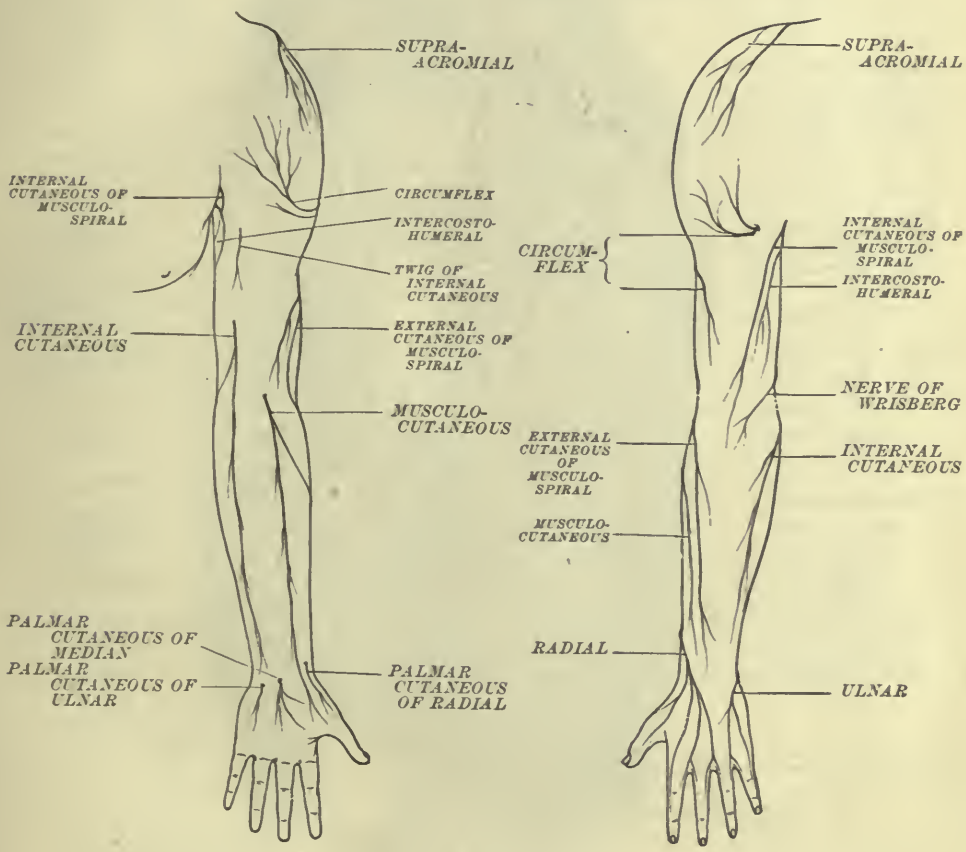
Study on the skeleton the bones of the shoulder- and elbow-joints.

Outline arteries, superficial veins, and superficial nerves. (See Figs. 95, 96, and 97.)

Dissection.—*Make an incision down the anterior part of the arm to two inches below the elbow; turn the skin outward and inward, exposing the superficial fascia, veins, and nerves.*

Study the superficial and deep fascia and lymphatics. *Note the epitrochlear gland.* (Fig. 96.)

FIG. 97.—DISTRIBUTION OF CUTANEOUS NERVES ON THE ANTERIOR AND POSTERIOR ASPECTS OF THE SUPERIOR EXTREMITY.—(*Morris.*)



Clean and study the following:—

Veins (see Fig. 96):—

Cephalic.

Median cephalic.

Basilic. (See Fig. 95.)

Median basilic.

Bicipital fascia. (See Fig. 98.)

Note the relative positions of the veins, arteries, and nerves in front of the elbow.

Review the subclavian and axillary arteries. Then trace out the:—

Brachial artery and its branches. (Fig. 99.)

Brachial veins and tributaries.

FIG. 98.—THE BEND OF THE ELBOW, LEFT SIDE.—(*Morris.*)
(From a dissection by Dr. Alder Smith in the Museum of St. Bartholomew's Hospital.)

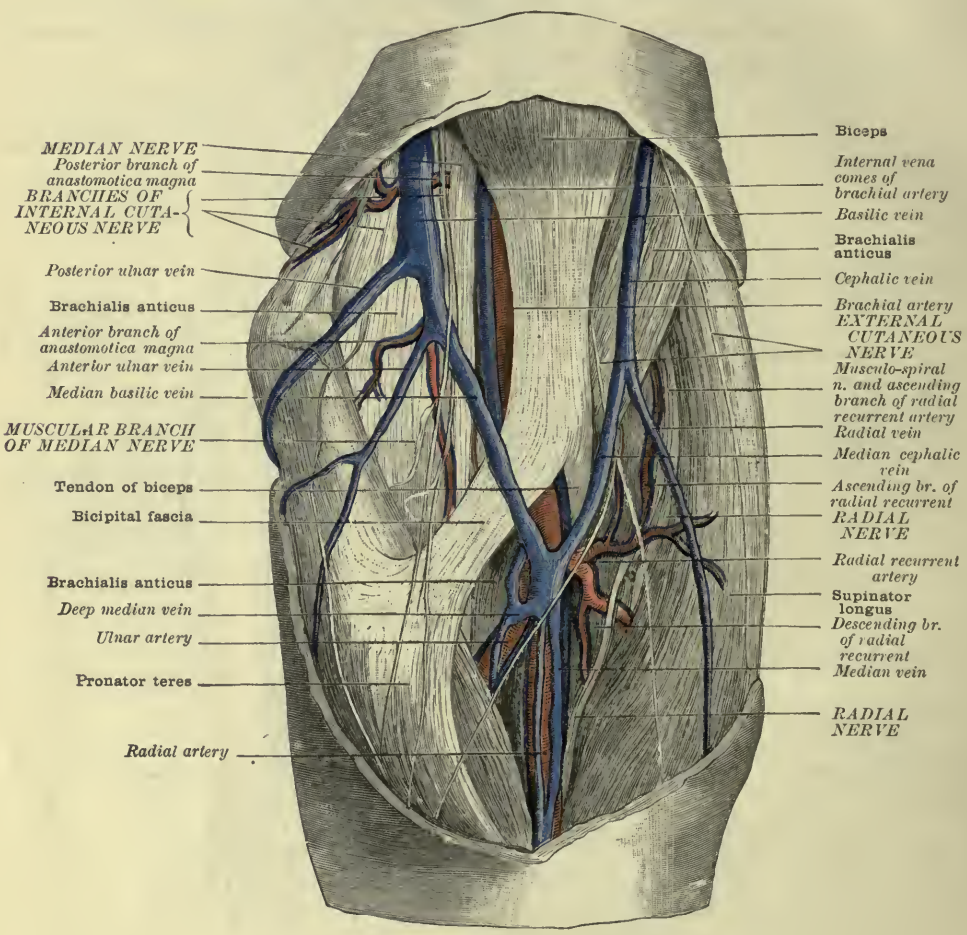
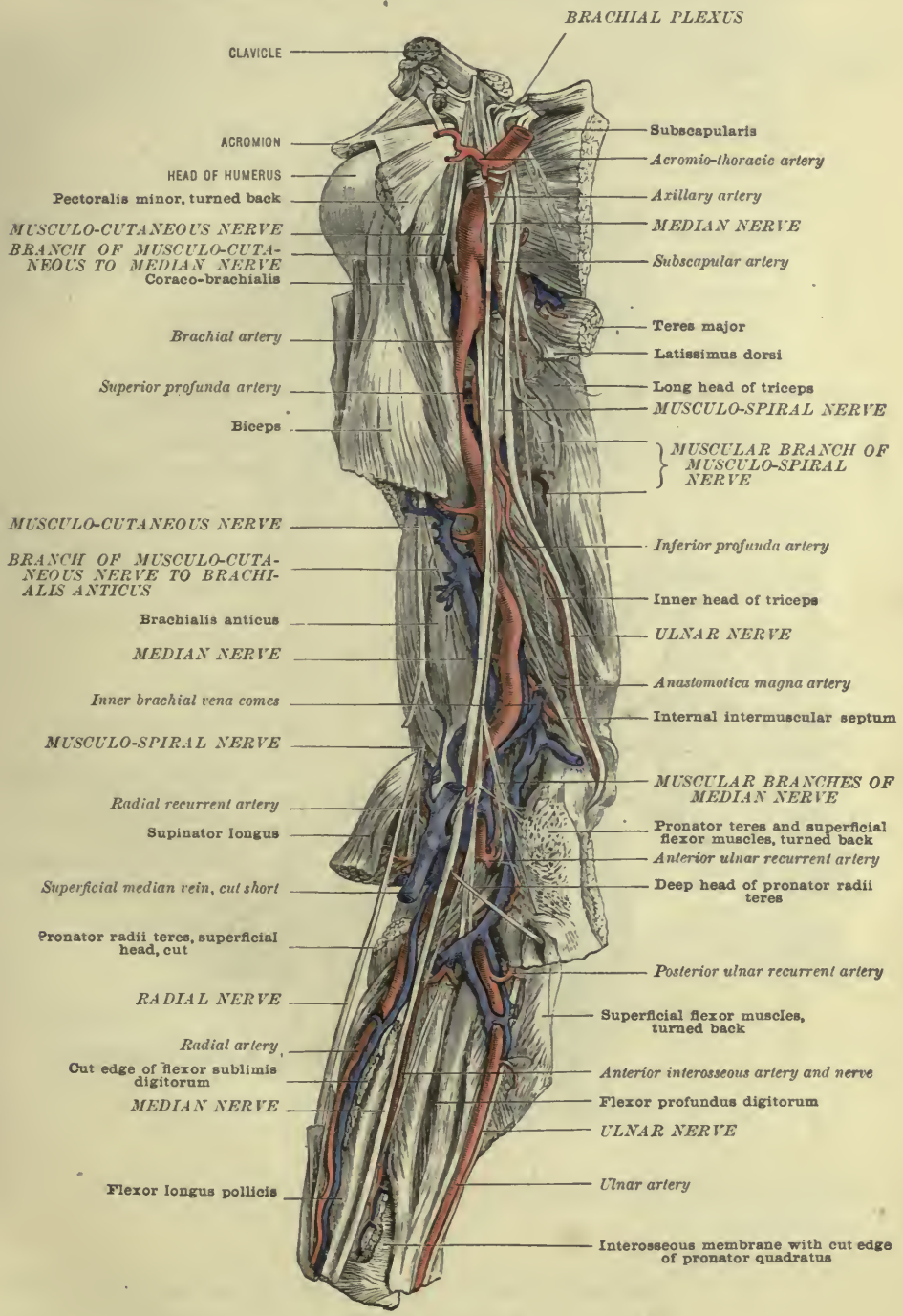


FIG. 99.—THE LOWER PART OF THE AXILLARY, THE BRACHIAL, AND THE RADIAL AND ULNAR ARTERIES, RIGHT SIDE.—(*Morris.*)

(From a dissection in the Museum of the Royal College of Surgeons of England.)



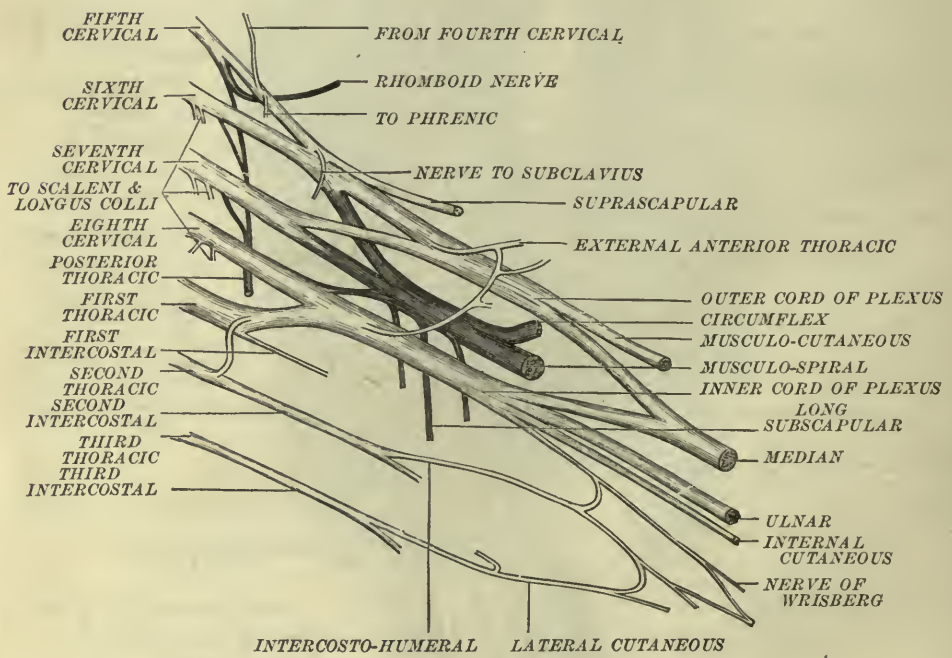
Clean and study the formation of the:—

BRACHIAL PLEXUS.

Branches of the brachial plexus:—

Nerve to rhomboid.
Suprascapular.
Posterior thoracic.
Anterior thoracic.
Wrisberg (*n. cutaneus brachii medialis minor*).
Internal cutaneous (*n. cutaneus brachii medialis*).
Subscapularis.
Musculo-cutaneus.
Ulnar.
Median.
Circumflex (*n. axillaris*).
Musculo-spiral (*radialis*).

FIG. 100.—DIAGRAM OF THE BRACHIAL PLEXUS.—(*Morris.*)
The posterior cord of the plexus is darkly shaded.



Dissect out and study the following:—

Muscle:—

Deltoid.

Separate the deltoid from its origin and turn it down. Note the posterior circumflex artery and circumflex nerve. (Fig. 102.)

FIG. 101.—DISSECTION OF THE LEFT ARM FROM THE FRONT, SHOWING PORTIONS OF THE ULNAR, MEDIAN, MUSCULO-CUTANEOUS, AND MUSCULO-SPIRAL NERVES.—(*Morris.*) Also see Fig. 111.

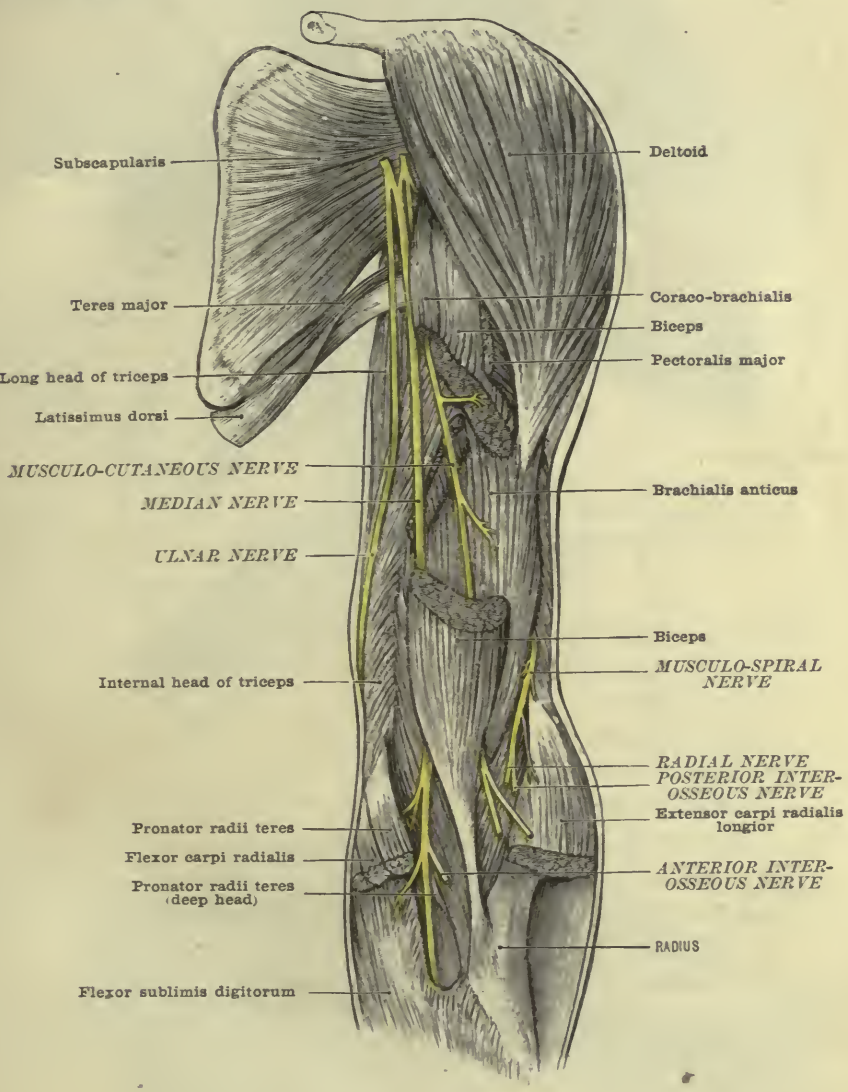
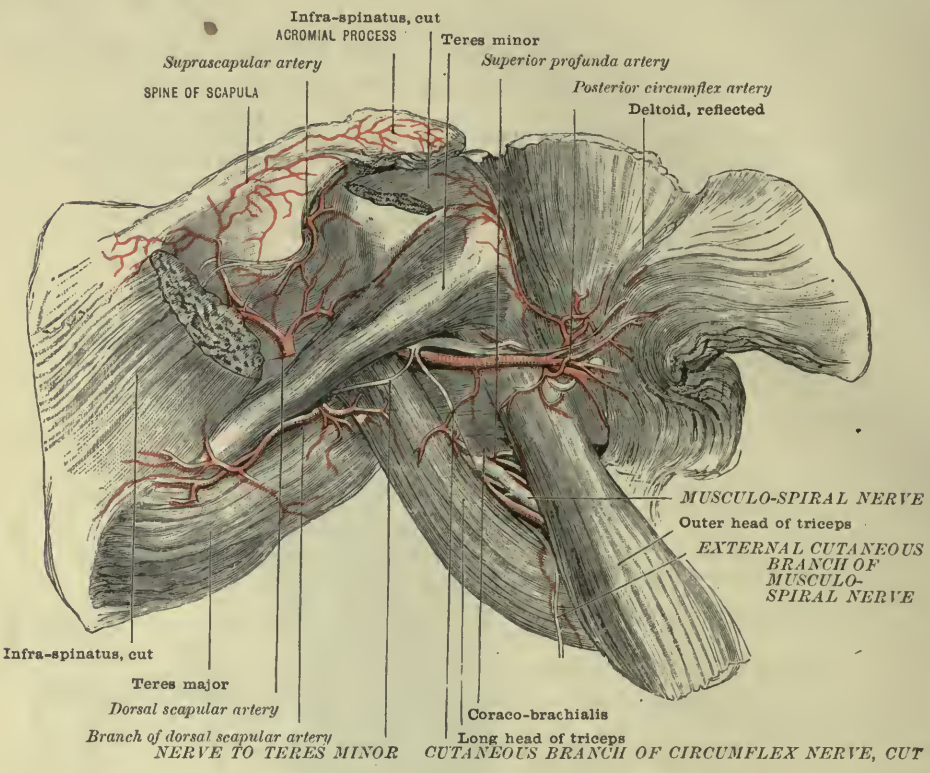


FIG. 102.—THE RIGHT POSTERIOR CIRCUMFLEX ARTERY.—(*Morris.*)
(From a dissection by Mr. Horner in the Museum of St. Bartholomew's Hospital.)



Muscles, continued:—

Supra-spinatus. (See Fig. 103.)
Teres minor.
Teres major.
Subscapularis. (See Fig. 104.)
Coraco-brachialis.
Biceps (*m. biceps brachii*). (See Fig. 105.)
Brachialis anticus (*m. brachialis*).
Triceps (*m. triceps brachii*). (See Fig. 103.)
Latissimus dorsi.
Subanconeus (*m. anconæus*).

When the dissection of the shoulder and arm is completed place the parts in their proper position and study the relation each part bears to its surroundings.

FIG. 103.—BACK VIEW OF THE SCAPULAR MUSCLES AND TRICEPS.—(*Morris.*)

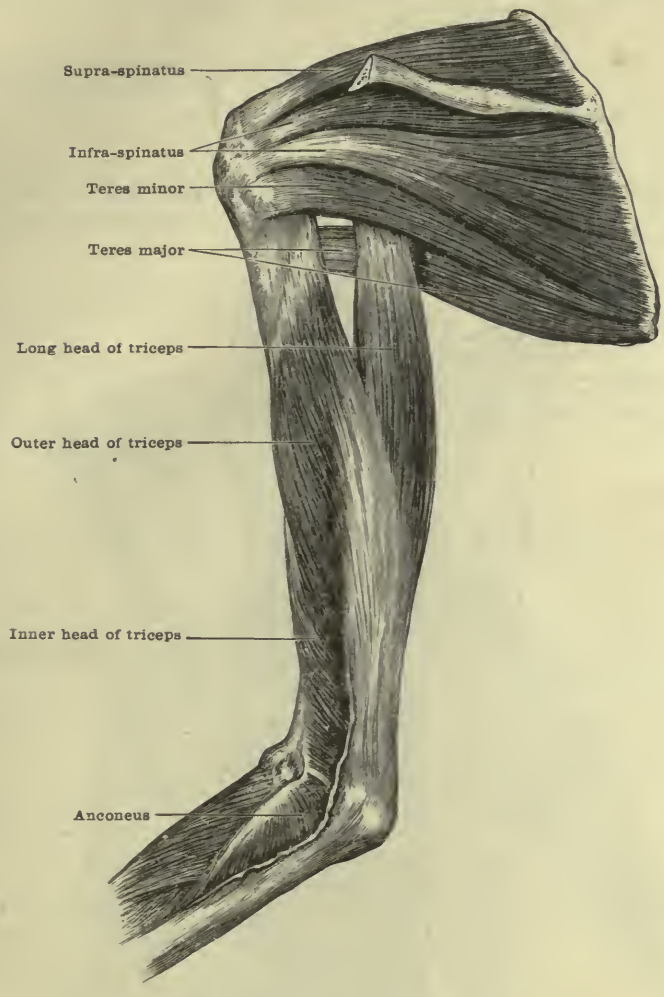


FIG. 104.—FRONT VIEW OF THE SCAPULAR MUSCLES.—(*Morris.*)

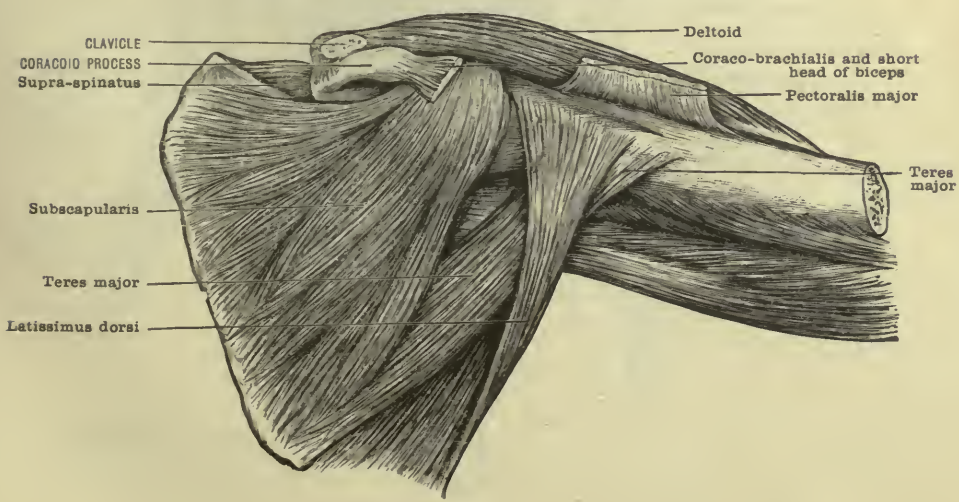
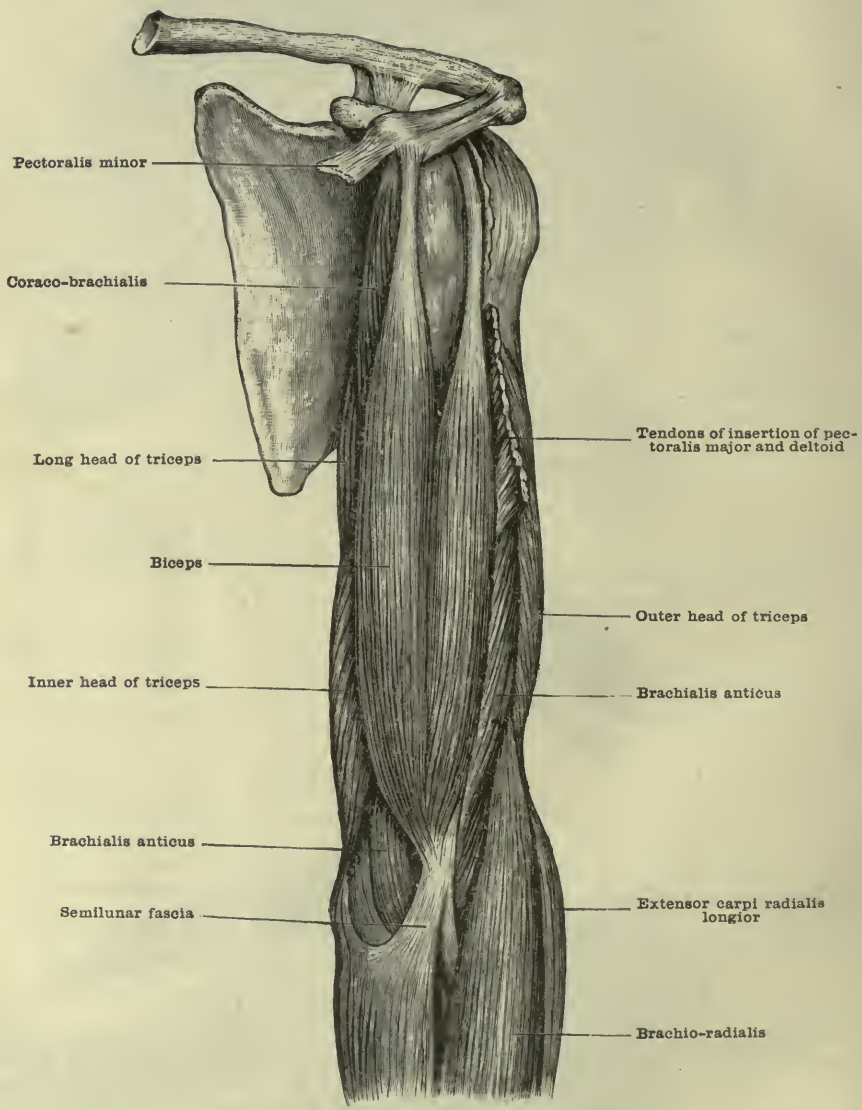


FIG. 105.—SUPERFICIAL VIEW OF THE FRONT OF THE UPPER ARM.—(*Morris.*)



DEMONSTRATION XV.

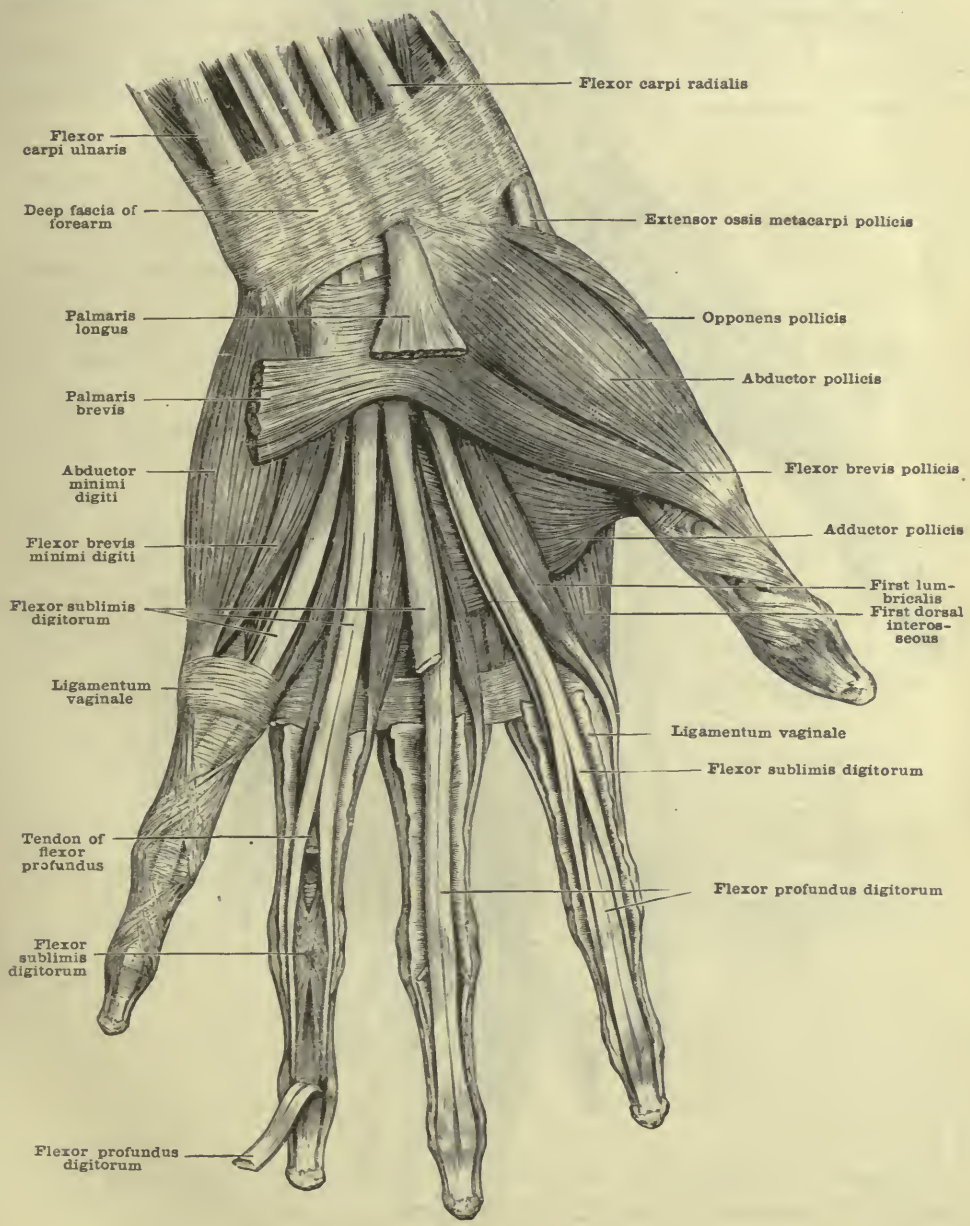
FOREARM, WRIST, AND HAND.

Study the bony parts of the elbow, wrist, and fingers on the articulated skeleton.

Outline the superficial nerves and veins.

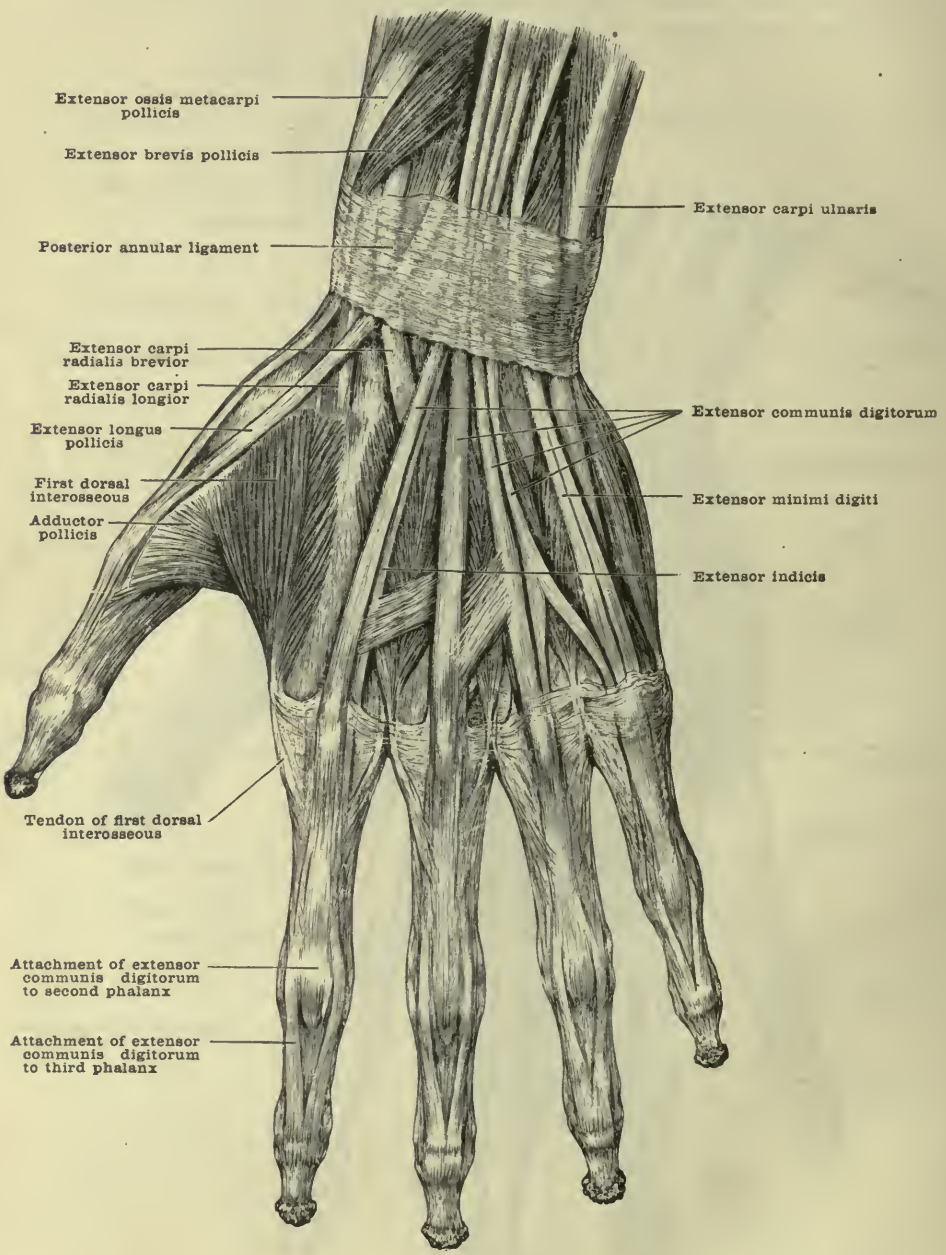
Study lymphatics. (See Figs. 96 and 97.)

FIG. 106.—THE SUPERFICIAL MUSCLES OF THE PALM OF THE HAND.—(*Morris.*)



Dissection.—Make a vertical incision along the anterior middle line through the skin from the elbow to the wrist, then make a transverse incision from the lower extremity of the first incision. Turn off the skin, exposing the superficial fascia, superficial veins, and nerves.

FIG. 107.—TENDONS UPON THE DORSUM OF THE HAND.—(*Morris.*)



Dissect the skin down over the hand and fingers, taking care not to destroy the annular ligaments nor the nerves and arteries.

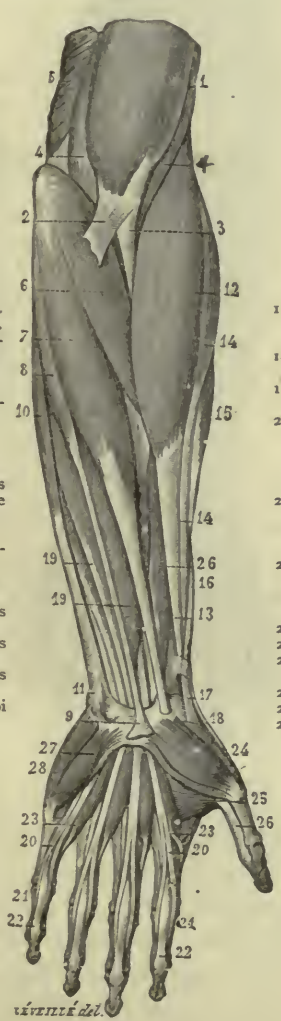
Observe and study:—

Fascia of forearm.
Fascia of hand.
Annular ligament (*ligamentum carpi transversum dorsale*). (See Figs. 106 and 107.)
Palmaris brevis muscle. (Fig. 106.)
Synovial membranes beneath the anterior annular ligament.

FOREARM.

To separate the muscles of the forearm begin with their tendons at the wrist and separate up toward the origin of the muscle. In separating the muscles do not destroy the arteries and nerves.

FIG. 108.—SUPERFICIAL MUSCLES ON THE ANTERIOR SURFACE OF THE LEFT FOREARM.—(*Holden.*)



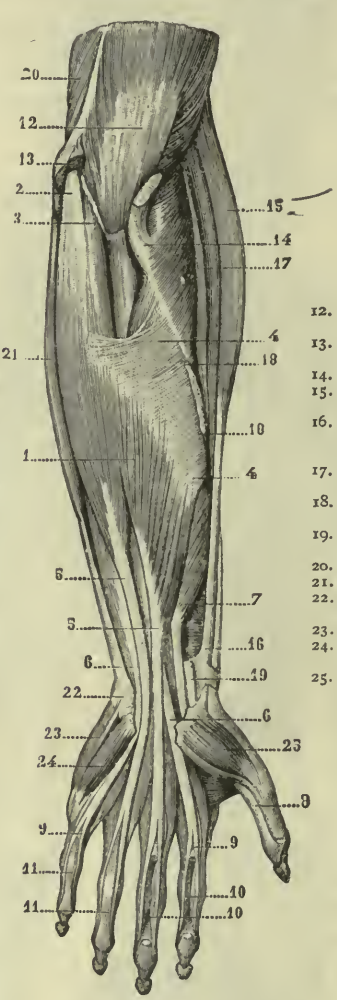
1. Inferior part of the biceps.
2. Aponeurosis of the biceps.
3. Tendon by which it is attached to the bicipital tuberosity of the radius.
4, 4. Brachialis anticus.
5. Internal head of the triceps.
6. Pronator radii teres.
7. Flexor carpi radialis.
8. Palmaris longus.
9. Inferior extremity of this muscle expanding into the palmar fascia.
10. Flexor carpi ulnaris.
11. The attachment to the pisiform bone.
12. Supinator longus or brachio-radialis.
13. Inferior attachment of this muscle.
14, 14. Extensor carpi radialis longior.
15. Extensor carpi radialis brevior.
16. Extensor ossis metacarpi pollicis.
17. Tendon of the same inserted into the metacarpal bone.
18. Tendon of the extensor secundi internodii pollicis.
19, 19. Flexor sublimis digitorum.
20, 20. Tendons of insertion dividing to allow the tendons of the flexor profundus digitorum to pass to their insertion.
21, 21. Insertion of the flexor sublimis digitorum to the lower part of the middle phalanges.
22, 22. Attachment of the flexor profundus digitorum to the distal phalanges.
23, 23. Lumbricales.
24. Abductor pollicis.
25. Its attachment to the proximal phalanx of the thumb.
26, 26. Flexor longus pollicis.
27. Flexor brevis digitorum.
28. Abductor minimi digiti.

Muscles in front of forearm:—

Superficial group. (See Fig. 108.)

Palmaris longus.
Flexor carpi radialis.
Flexor carpi ulnaris.
Flexor sublimis digitorum.
Pronator radii teres (*m. pronator teres*).

FIG. 109.—FLEXOR MUSCLES OF THE FINGERS.—(*Holden.*)



1. Flexor sublimis digitorum.
2. Its origin from the internal condyle.
3. Its origin from the coronoid process.
4, 4. Its origin from the radius.
5, 5. Its two superficial tendons to the middle and ring fingers.
6, 6. Its two deep tendons to the index and little fingers.
7. Flexor longus pollicis.
8. Tendon of this muscle.
9. Bifurcation of the tendons of the flexor longus digitorum.
10, 10. Groove made by these tendons.
11, 11. Tendons of the flexor profundus digitorum occupying these grooves and filling them up.
12. Brachialis anticus tendon.
13. Internal condyle of the humerus.
14. Biceps tendon.
15. Supinator longus or brachio-radialis.
16. Its attachment to the styloid process of the radius.
17. Extensor carpi radialis longior.
18. Tendon of insertion of the pronator radii teres.
19. Tendon of insertion of the flexor carpi radialis.
20. Triceps.
21. Flexor carpi ulnaris.
22. Its attachment to the pisiform bone.
23. Abductor minimi digiti.
24. Flexor brevis minimi digiti.
25. Abductor pollicis.

Deep group. (See Fig. 109.)

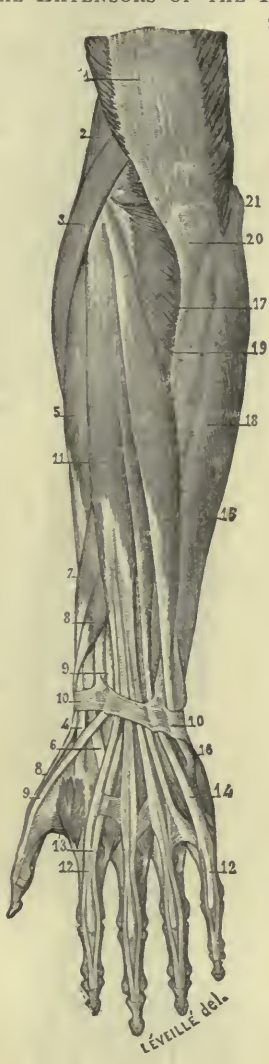
Flexor profundus digitorum.
Flexor longus pollicis.
Pronator quadratus.

Muscles of the back of forearm. (See Fig. 110.)

Superficial group.

Brachio-radialis.
Extensor carpi radialis longior.
Extensor carpi radialis brevior.
Extensor communis digitorum.
Extensor minimi digiti.
Extensor carpi ulnaris.
Anconeus.

FIG. 110.—SUPERFICIAL EXTENSORS OF THE FOREARM.—(*Holden.*)



1. Tendon of the triceps.
2. Origin of the supinator longus or brachio-radialis.
3. Extensor carpi radialis longior.
4. Insertion of this muscle.
5. Extensor radialis brevior.
6. Insertion of this muscle.
7. Extensor ossis metacarpi pollicis.
8, 8. Extensor brevis or primi internodii pollicis.
9, 9. Extensor longus or secundi internodii pollicis.
10, 10. Posterior annular ligament.
11. Extensor communis digitorum.
12, 12. Attachments of the tendons of this muscle to the middle and distal phalanges of the four fingers.
13. Tendons of the extensor indicis uniting with the tendon of the communis digitorum indicis.
14. Tendon of the extensor minimi digiti mingling posteriorly with the tendon of the communis to the little finger.
15. Extensor carpi ulnaris.
16. Its insertion into the metacarpal bone.
17. Anconeus.
18. Flexor carpi ulnaris attached to the posterior border of the ulna by the aponeurosis.

Deep group.

Supinator radii brevis (*m. supinator*).
Extensor ossis metacarpi pollicis (*m. abductor pollicis longus*).
Extensor brevis pollicis.

Extensor longus pollicis.
Extensor indicis.

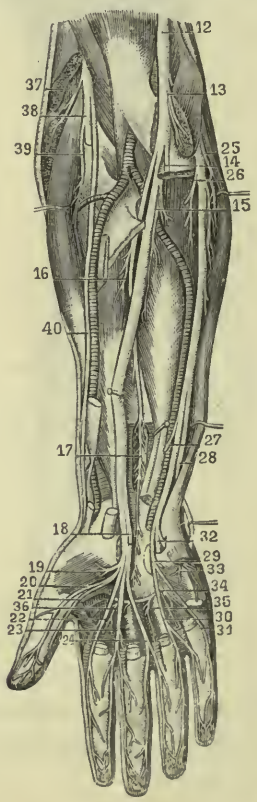
Trace out and study the arteries and nerves of the forearm.

Nerves. (See Figs. 111 and 112):—

Internal cutaneous.
Median.
Anterior interosseous.
Ulnar.
Musculo-spiral (*radialis*).
Radial.
Posterior interosseous.

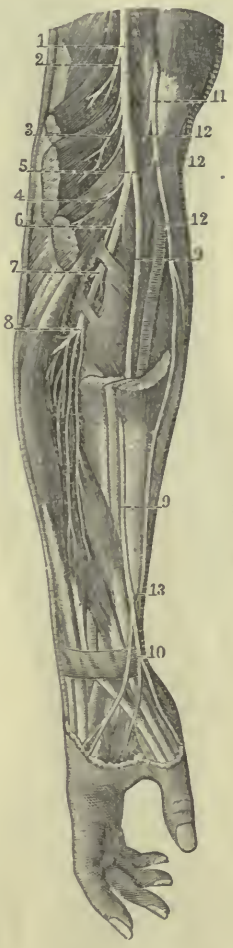
FIG. 111.—TERMINAL PORTION OF THE MEDIAN AND ULNAR NERVES.—(*Holden.*)

12. Forearm, palmar, and digital portions of these nerves. 13. Branch to the pronator radii teres muscle. 14. Anterior muscular branches divided and removed. 15. Branch to the flexor profundus digitorum. 16. Branch to the flexor longus pollicis. 17. Branch to the interosseous membrane. 18. Palmar (cutaneous) branch divided below its origin. 19. To the thenar eminence. 20. External lateral branch of the thumb. 21. Internal lateral branch of the same. 22. External digital branch to the index finger. 23. Common trunk to the index and middle fingers. 24. Digital branches from the median to the middle finger and the thumb side of the ring finger. 25. Ulnar nerve. 26. Branch of the same nerve to the flexor profundus digitorum. 27. Cutaneous and anastomosing filament from the ulnar. 28. Dorsal branch of this nerve. 29. Superficial palmar branch. 30. Common trunk for the ring and little fingers. 31. Digital branch to the internal side of the little finger. 32. Deep palmar branch. 33. Branches from the preceding to the hypothenar eminence. 34. Branches to the fourth interosseous and fourth lumbricales. 35. Branches to the same in the third. 36. Branches to the adductor pollicis and the muscles of the first and second interosseous spaces. 37, 38, 39, 40. Branches of radial.



Arteries (Figs. 111, 113, and 114):—
Radial and branches.
Ulnar and branches.
Anastomosis about elbow-joint.

FIG. 112.—TERMINAL BRANCHES OF THE RADIAL NERVE.—(*Holden.*)



1. Trunk of the radial nerve.
2. Its branch to brachio-radialis.
3. Its branch to extensor carpi radialis longior.
4. Its branch to extensor carpi radialis brevior.
5. Bifurcation of the trunk.
6. Posterior or muscular branch.
7. The same branch traversing the supinator brevis and supplying it.
8. Terminal filaments of this division.
9, 9. Anterior or cutaneous branch of this nerve.
10. Termination of this branch.
11. Musculo-cutaneous n.
12. Its terminal divisions.
13. Anastomosing branch with the cutaneous division of the radial

FIG. 113.—THE ARTERIES OF THE FOREARM WITH THE SUPERFICIAL PALMAR ARCH.—(*Morris.*)

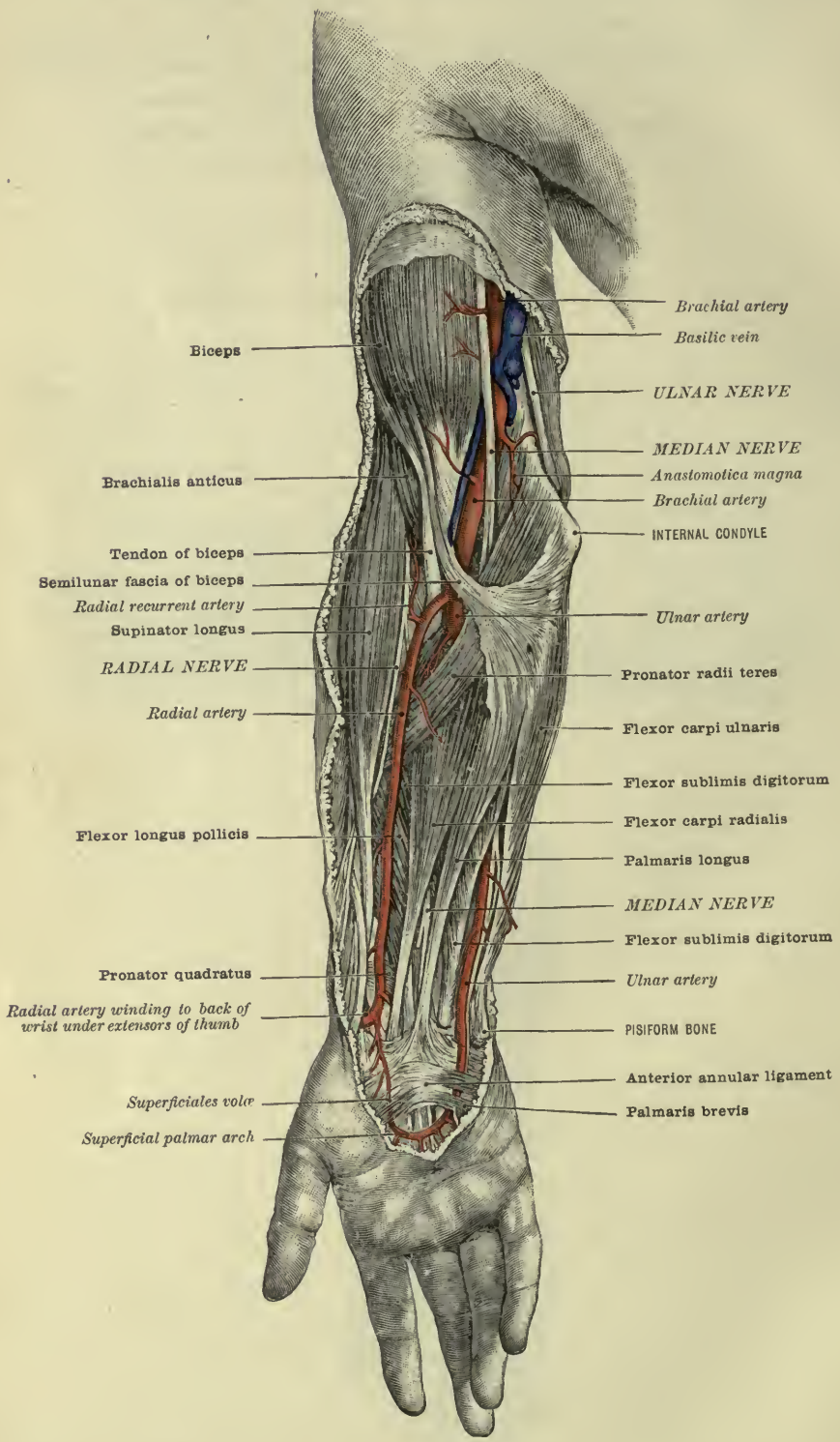
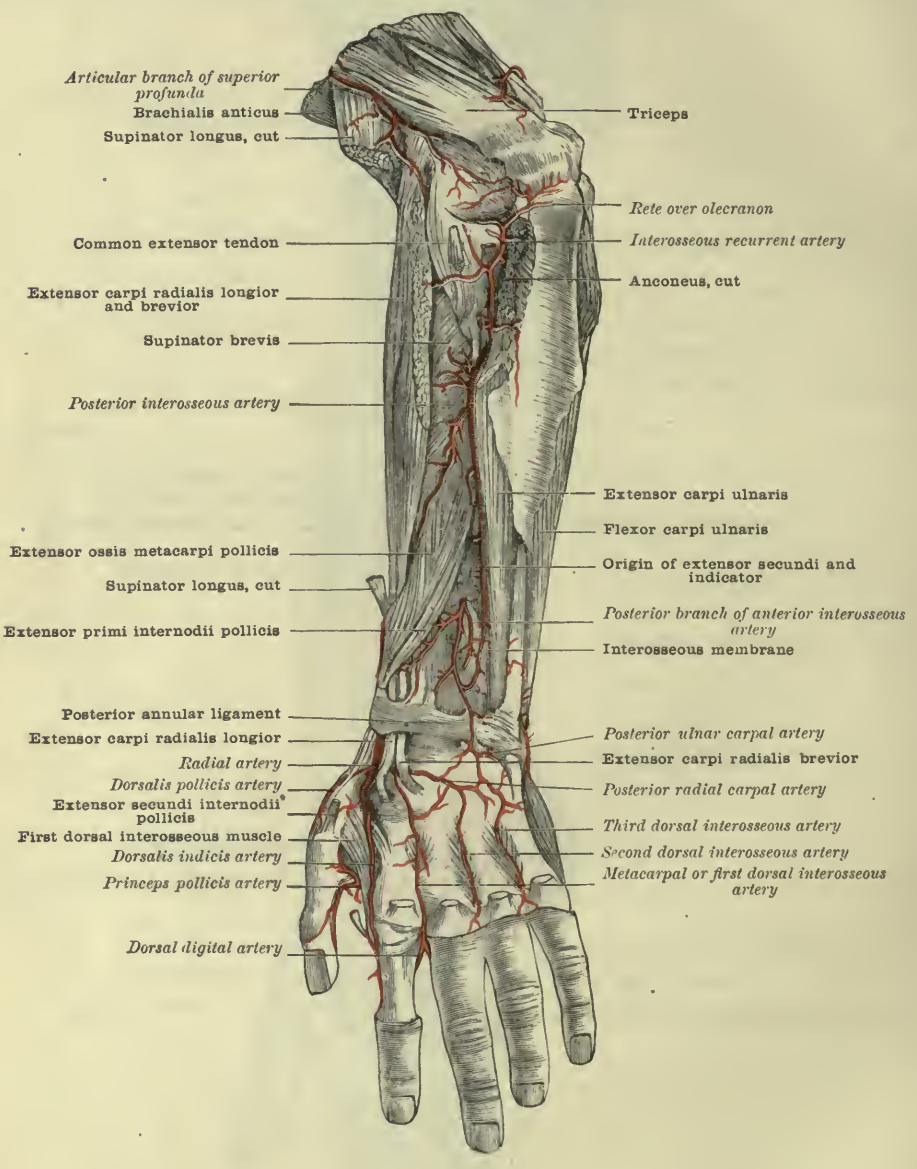


FIG. 114.—THE ARTERIES OF THE RIGHT FOREARM AND THE DEEP PALMAR ARCH.—(*Morris.*)

FIG. 115.—THE BACK OF THE LEFT FOREARM, WITH THE POSTERIOR INTEROSSEOUS ARTERY AND BRANCHES OF THE RADIAL AT THE BACK OF THE WRIST.—(*Morris.*)
(From a dissection in the Hunterian Museum.)



HAND.

Muscles:—

Palm:—

Palmaris brevis.

Lumbricales.

Interossei—*these are best exposed later.* (Figs. 119 and 120.)

Thenar eminence. (Fig. 118.)

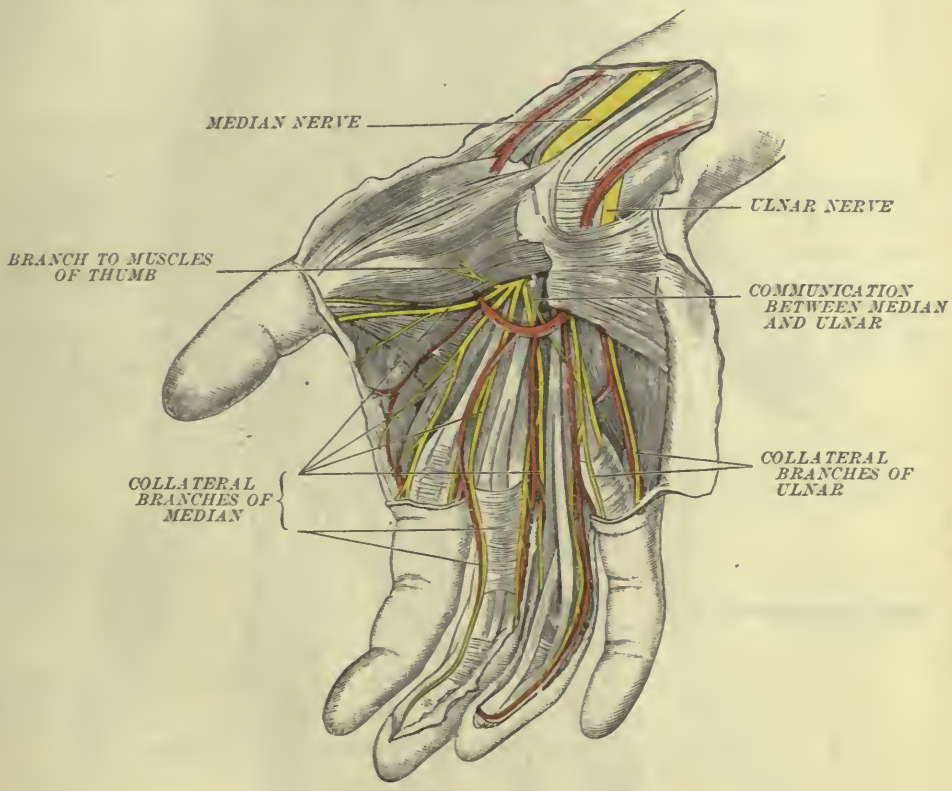
Abductor pollicis.

Opponens pollicis.

Flexor brevis pollicis.

Adductor pollicis.

FIG. 116.—SUPERFICIAL NERVES OF THE PALM. (Ellis.) (*Morris.*)



Hypothenar eminence. (Fig. 118.)

Abductor minimi digiti.

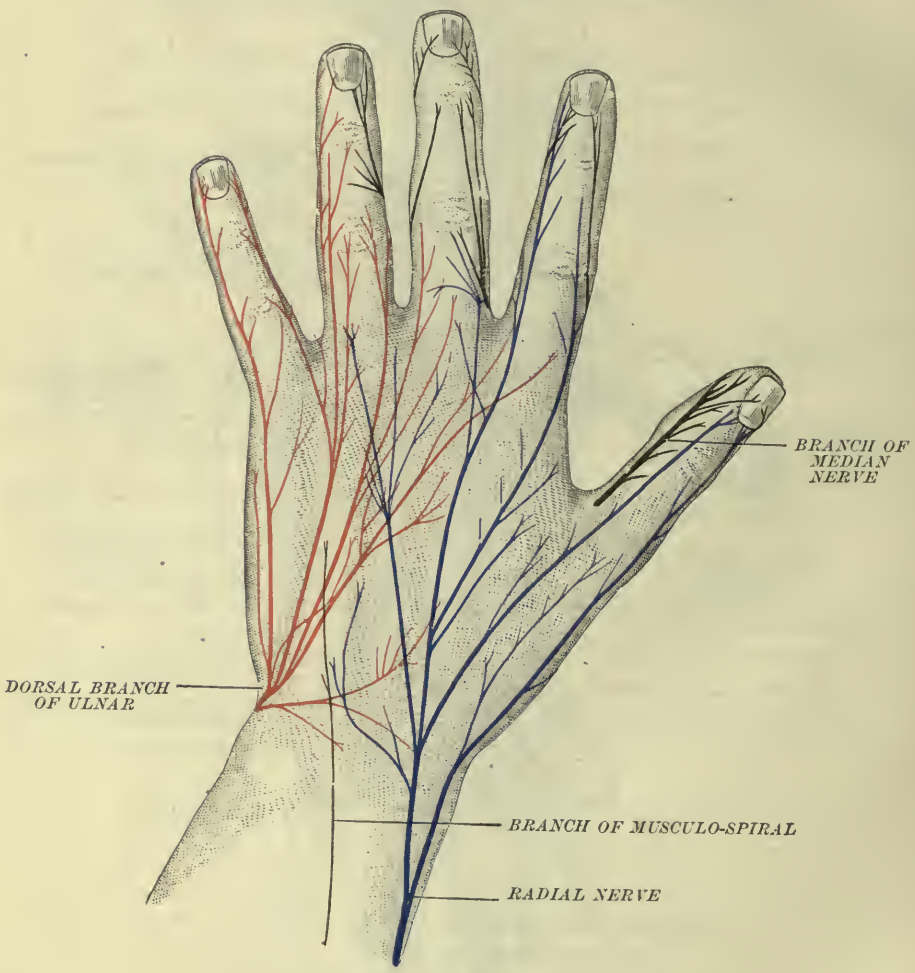
Flexor brevis minimi digiti.

Opponens minimi digiti.

Trace out the arteries and nerves of hand.

Arteries. (See Figs. 114, 115 and 124):—
Superficial palmar arch.
Deep palmar arch.
Dorsal interosseous.
Dorsalis indicis.
Princeps pollicis.
Dorsal digital.

FIG. 117.—A DISSECTION OF THE CUTANEOUS NERVES ON THE DORSAL ASPECT OF THE HAND AND FINGERS. (H. St. J. B.) (*Morris.*)
The branches of the median nerve are shown in black.



See Figs. 111, 112 and 116.
Nerves:—
Median.
Ulnar.
Radial.

FIG. 118.—THE SUPERFICIAL MUSCLES OF THE PALM OF THE HAND.—(*Morris.*)

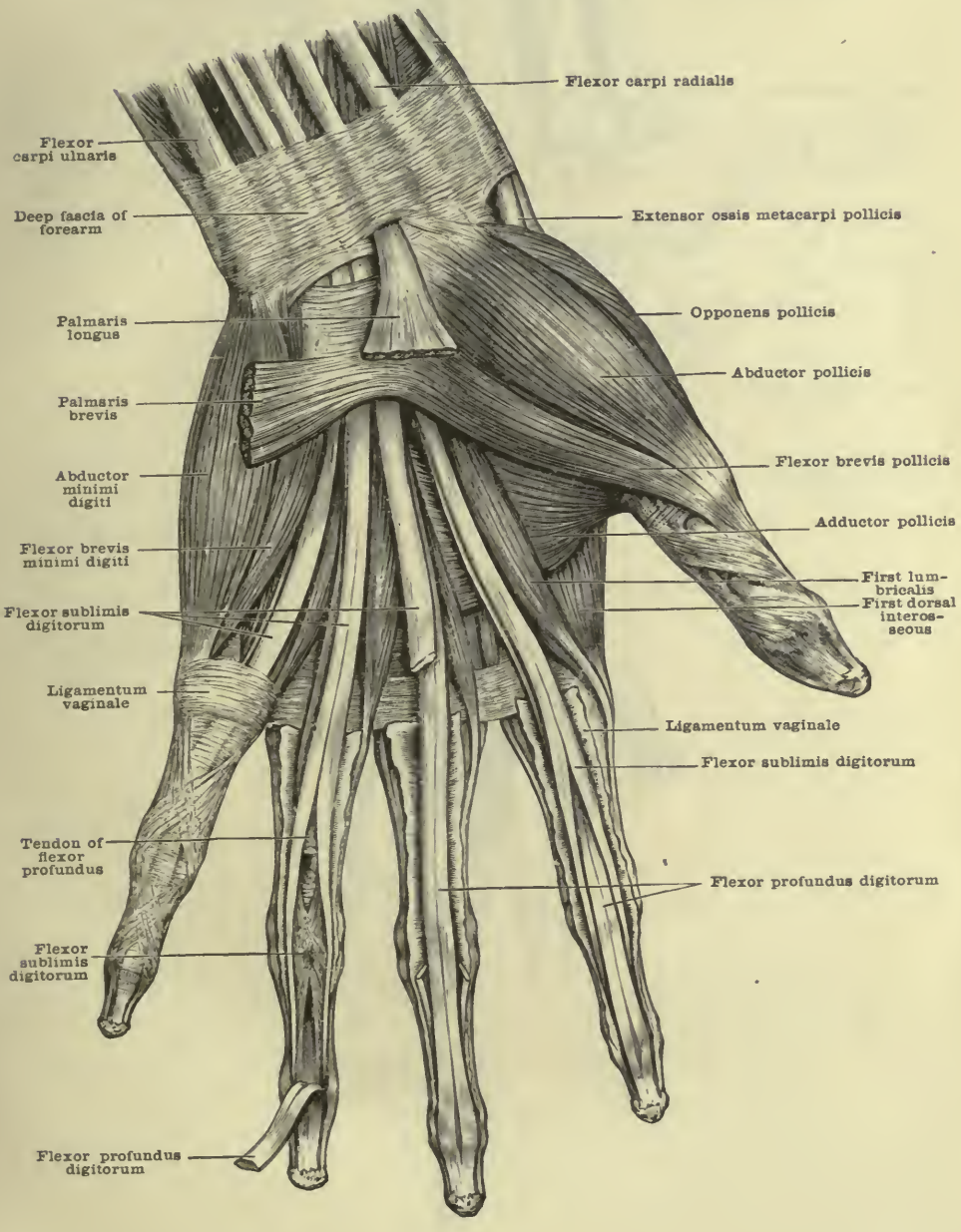


FIG 119.—THE PALMAR INTEROSSEI.—(*Morris.*)

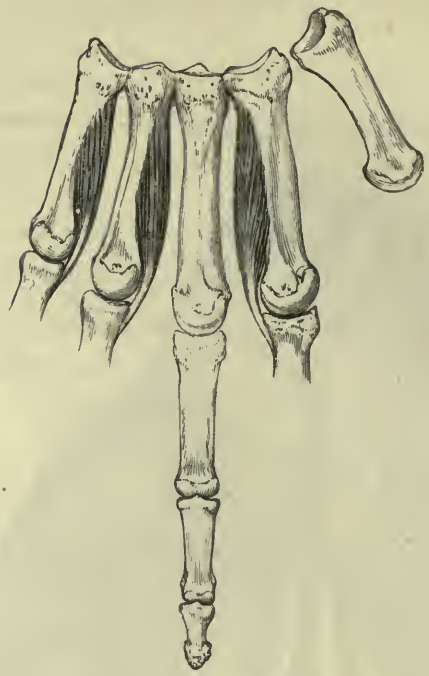
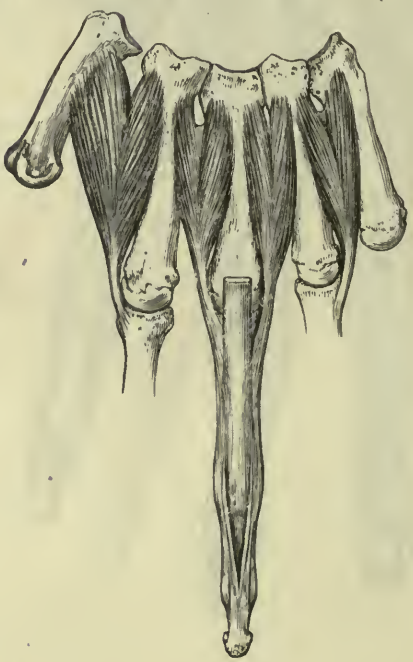


FIG. 120.—THE DORSAL INTEROSSEI.—(*Morris.*)



After completing the dissection of the forearm, wrist, and hand place the parts in their proper position and study the relation each part bears to its surroundings.

Examine the anastomoses of the arteries of the upper extremity shown in the following figures.

FIG. 121.—THE ANASTOMOSES ABOUT THE SCAPULA.—(*Morris.*)

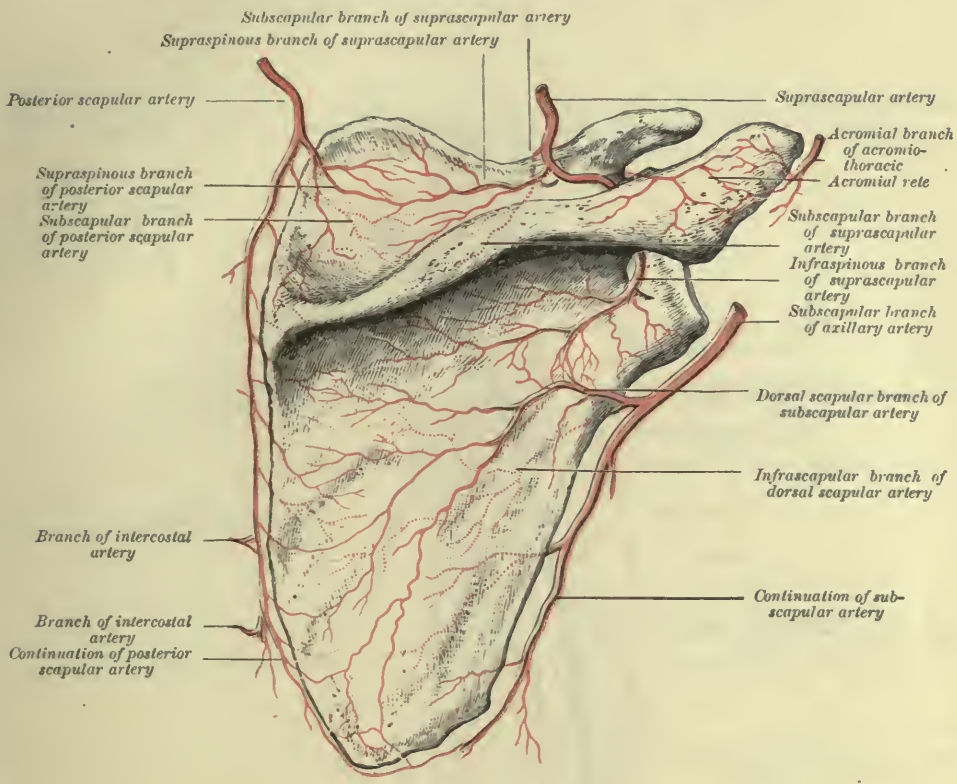

Subscapular branch of suprascapular artery
Supraspinous branch of suprascapular artery
Posterior scapular artery
Suprascapular artery
Acromial branch of acromio-thoracic
Acromial rete
Supraspinous branch of posterior scapular artery
Subscapular branch of posterior scapular artery
Subscapular branch of suprascapular artery
Infraspinous branch of suprascapular artery
Subscapular branch of axillary artery
Dorsal scapular branch of subscapular artery
Infrascapular branch of dorsal scapular artery
Branch of intercostal artery
Continuation of subscapular artery
Branch of intercostal artery
Continuation of posterior scapular artery

FIG. 122.—DIAGRAM OF THE ANASTOMOSES OF THE BRACHIAL ARTERY (MacCormac and Anderson.) (*Morris.*)

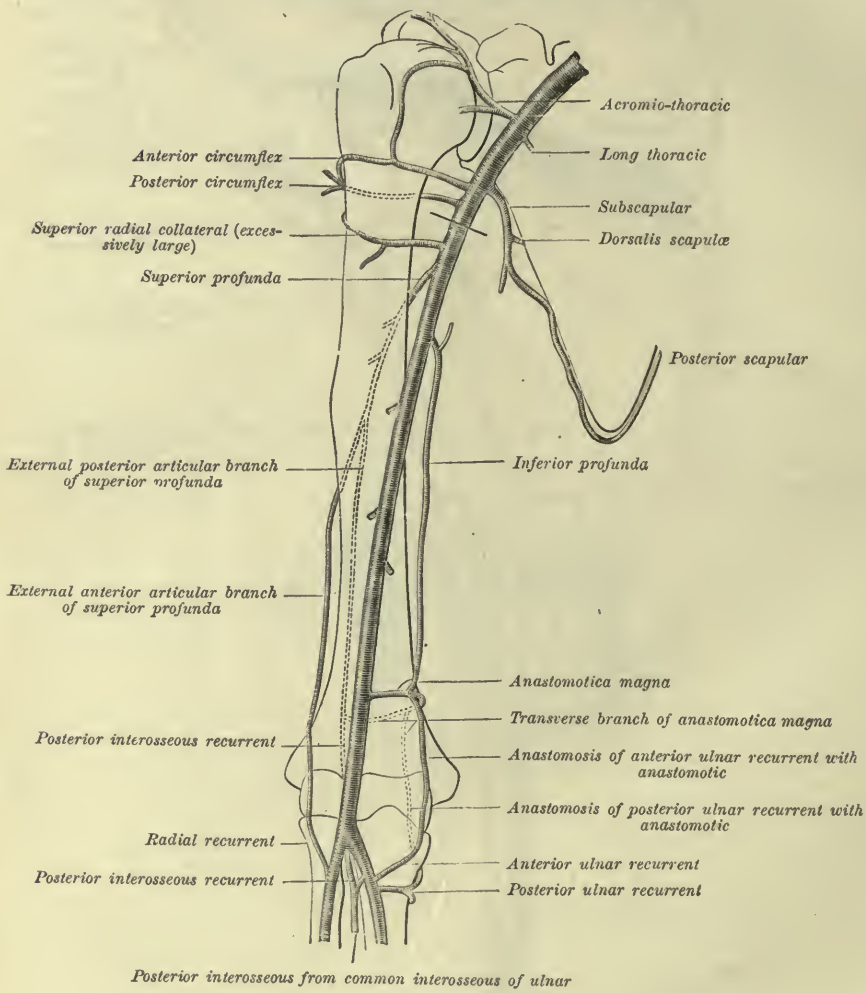


FIG. 123.—DIAGRAM OF THE RELATION OF THE ARTERIES OF THE LEFT FOREARM TO THE BONES. (Walsham.) (*Morris.*)

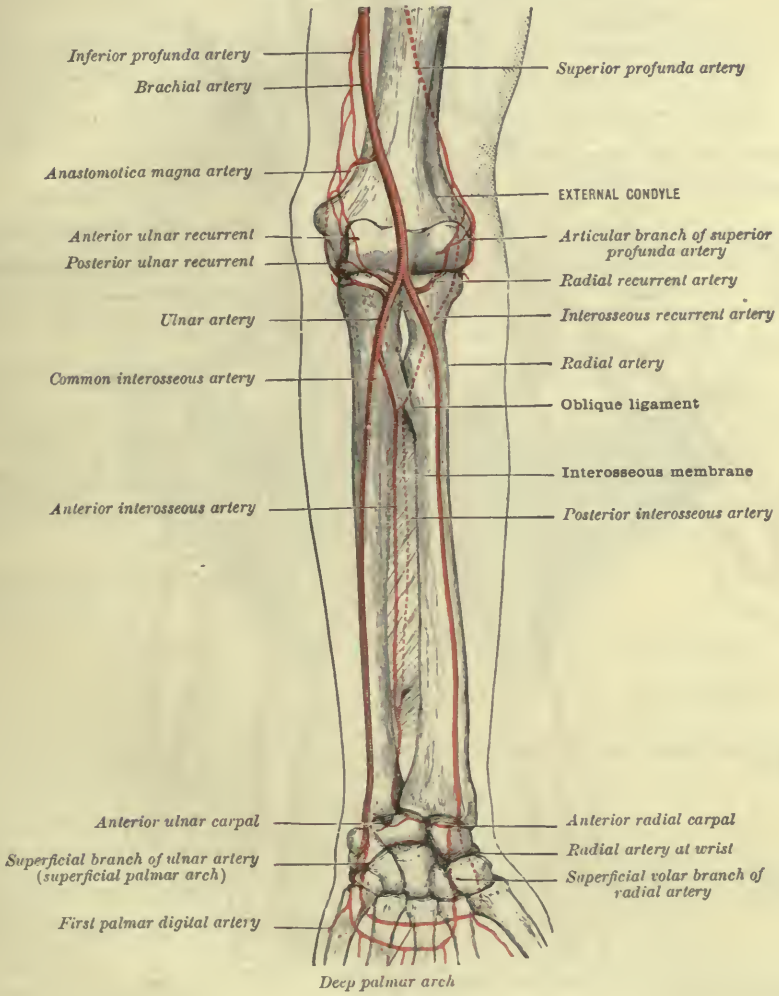
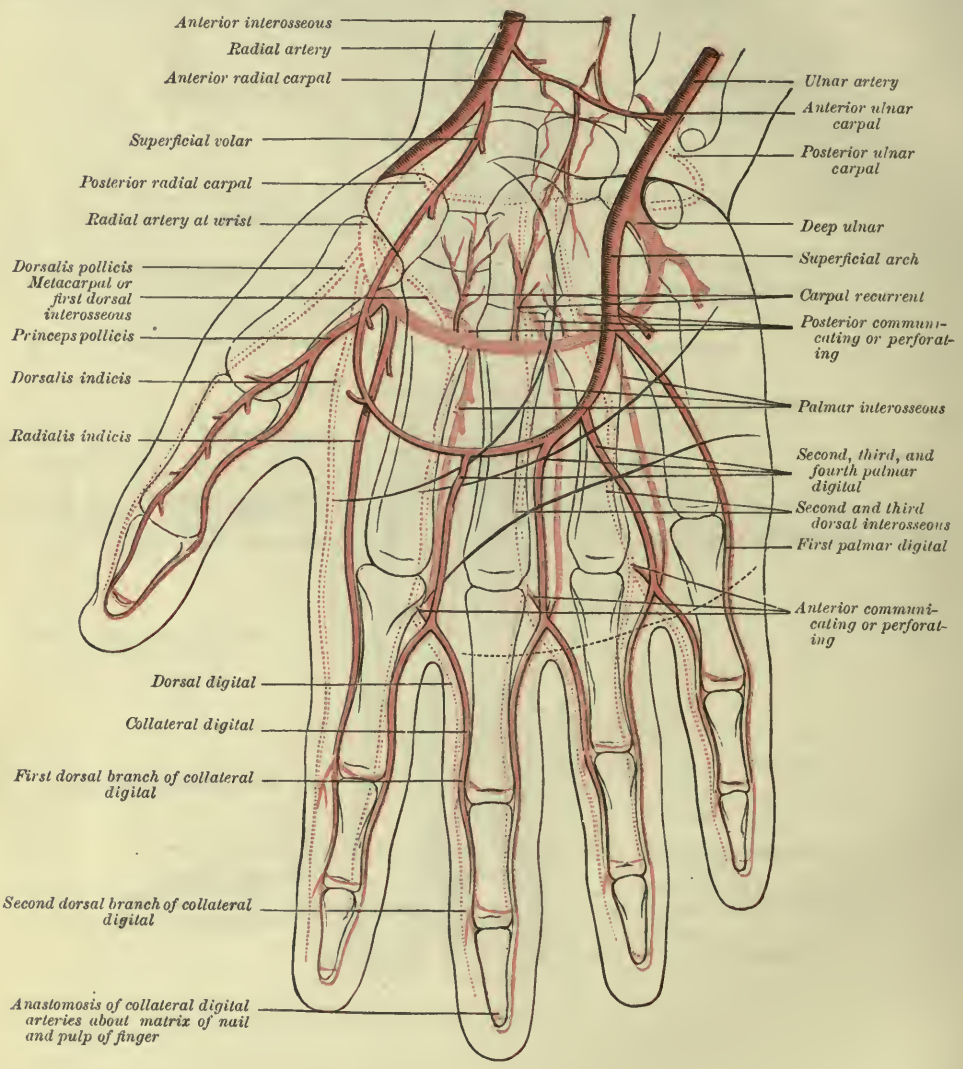


FIG. 124.—ANASTOMOSES AND DISTRIBUTION OF THE ARTERIES OF THE HAND. (Walsham.) (*Morris.*)



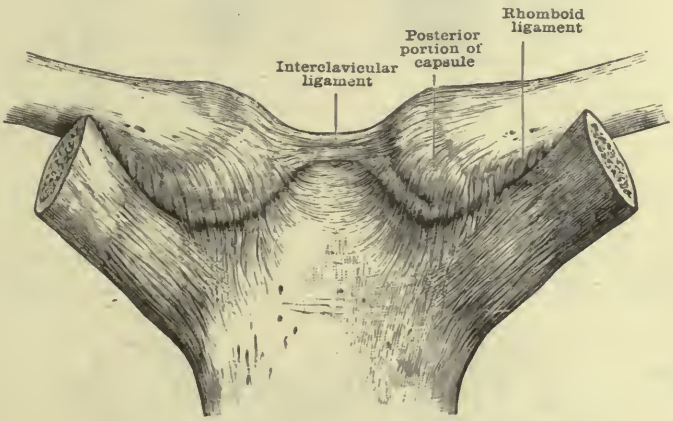
DEMONSTRATION XVI.

ARTICULATIONS AND LIGAMENTS.

Classes of articulations.
Various movements of joints.
Expose the ligaments in the following articulations:—
Articulations of vertebral column.

1. Connecting the bodies of the vertebræ.
2. Connecting the laminæ.
3. Connecting the articular processes.
4. Connecting the spinous processes.
5. Connecting transverse processes.

FIG. 125.—POSTERIOR VIEW OF THE STERNO-COSTO-CLAVICULAR JOINT.—(*Morris.*)



Sterno-costo-clavicular.
Scapulo-clavicular.
Shoulder-joint.
Elbow-joint.
Radius with ulna.
Radio-carpal.
Carpal.
Carpo-metacarpal.
Interphalangeal.

FIG. 126.—ANTERIOR VIEW OF STERNO-COSTO-CLAVICULAR JOINT.—(*Morris.*)

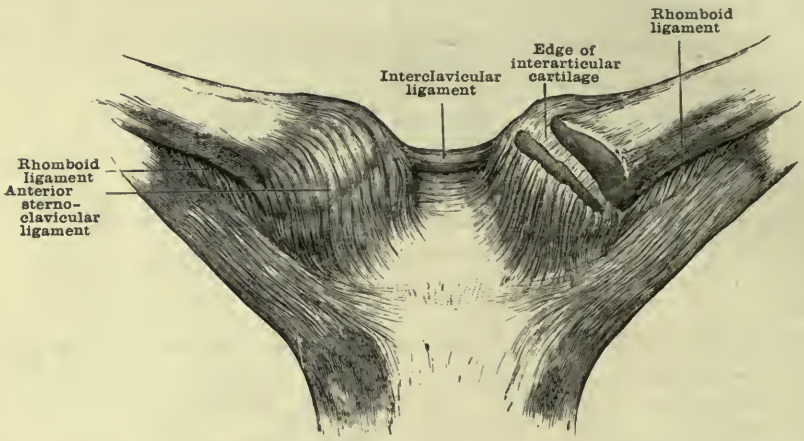


FIG. 127.—SECTION THROUGH STERNO-CLAVICULAR JOINT.—(*Morris.*)

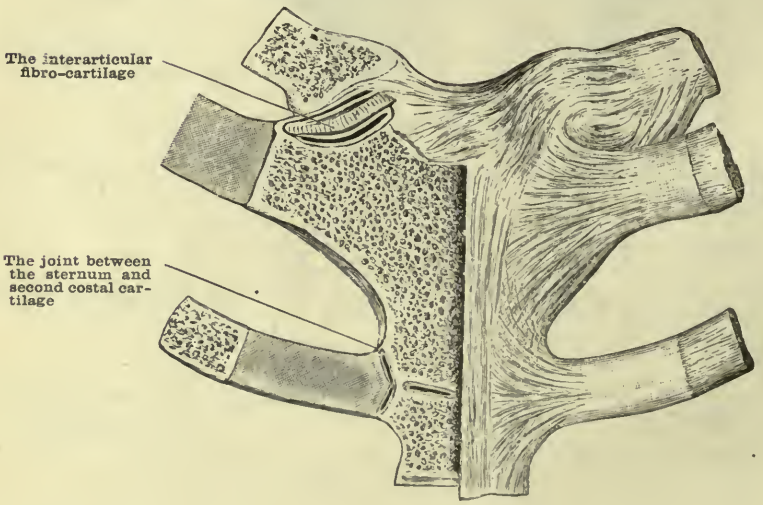


FIG. 128.—ANTERIOR VIEW OF SHOULDER, SHOWING ALSO CORACO-CLAVICULAR AND CORACO-ACROMIAL LIGAMENTS.—(*Morris.*)

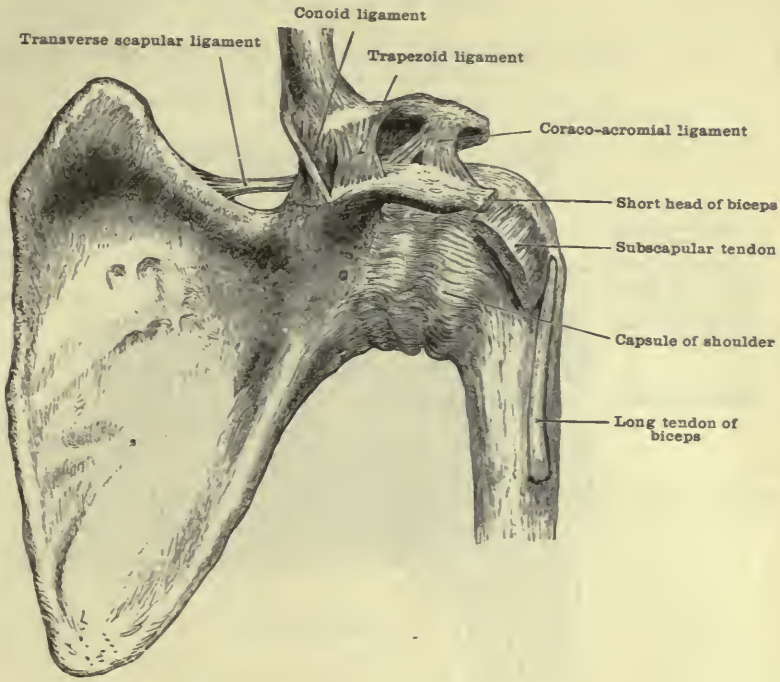


FIG. 129.—POSTERIOR VIEW OF THE SHOULDER-JOINT, SHOWING ALSO THE ACROMIO-CLAVICULAR JOINT AND THE SPECIAL LIGAMENTS OF THE SCAPULA.—(*Morris.*)

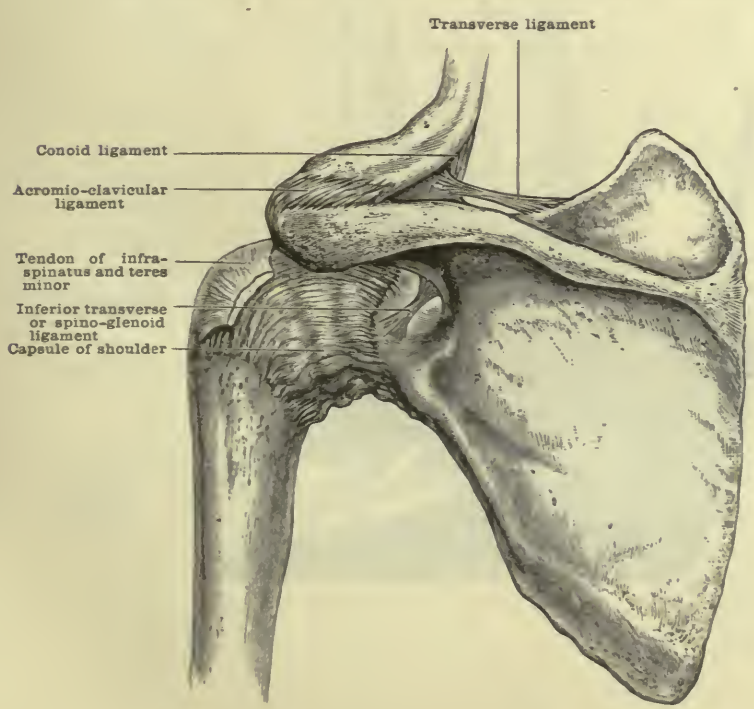


FIG. 130.—VERTICAL SECTION THROUGH THE SHOULDER-JOINT TO SHOW THE GLENO-HUMERAL LIGAMENT.—(*Morris.*)
(The joint is opened from behind.)

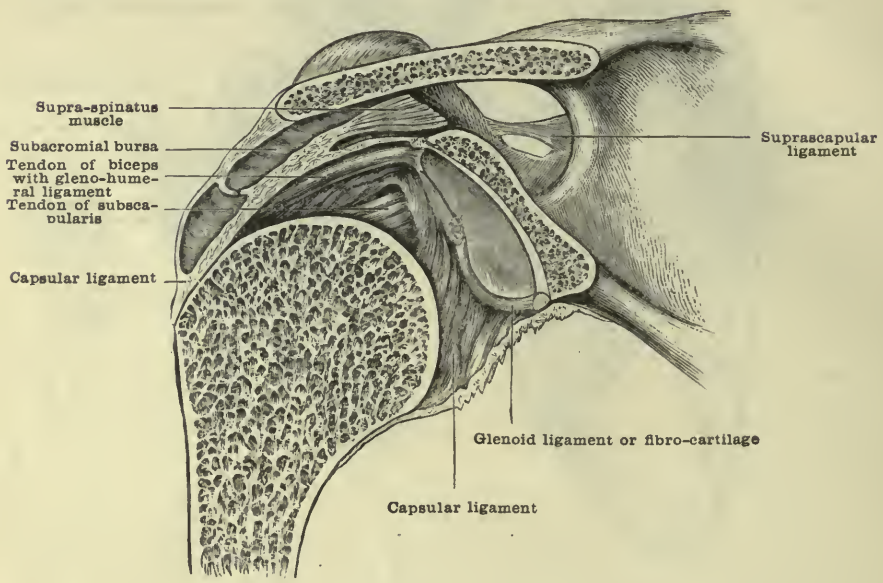


FIG. 131.—INTERNAL VIEW OF THE ELBOW-JOINT.—(*Morris.*)

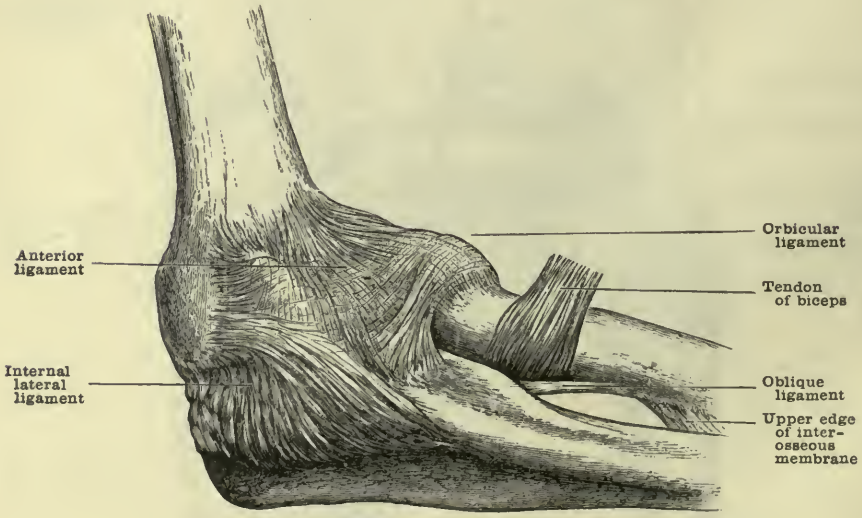


FIG. 132.—EXTERNAL VIEW OF THE ELBOW-JOINT.—(*Morris.*)

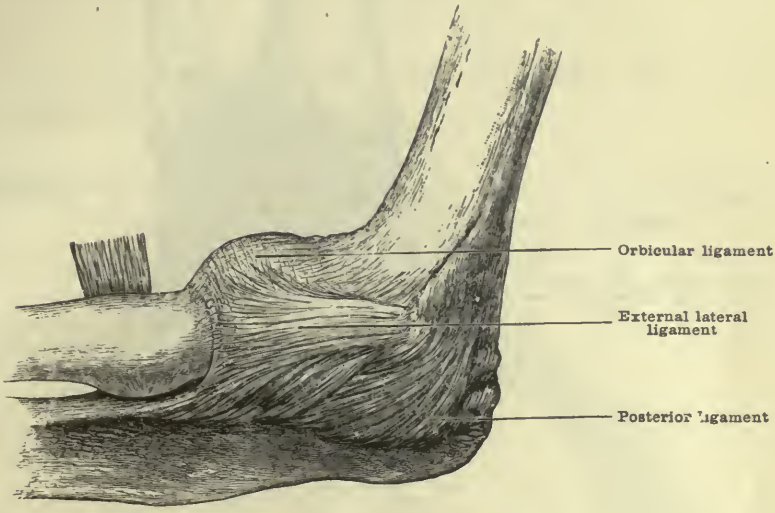


FIG. 133.—ANTERIOR VIEW OF WRIST.—(*Morris.*)

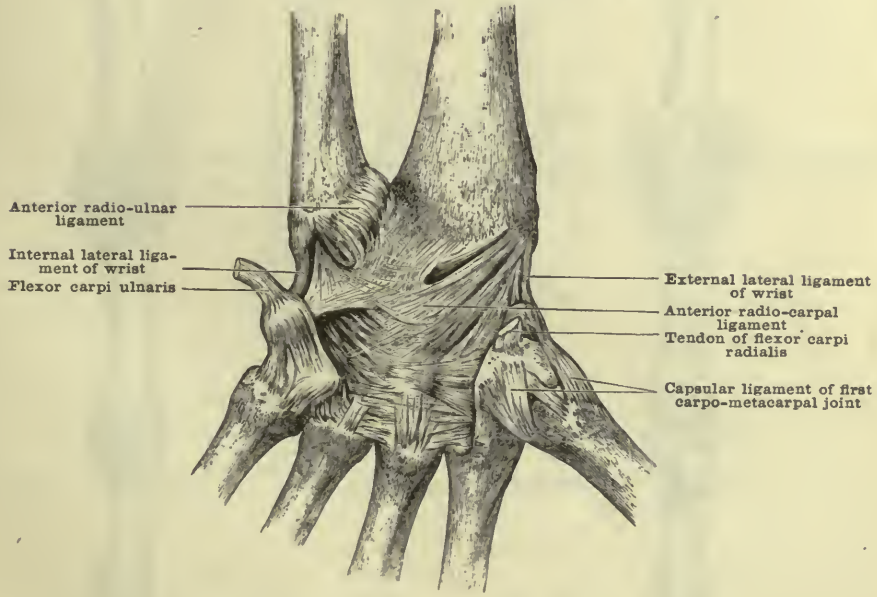

Anterior radio-ulnar ligament
Internal lateral ligament of wrist
Flexor carpi ulnaris
External lateral ligament of wrist
Anterior radio-carpal ligament
Tendon of flexor carpi radialis
Capsular ligament of first carpo-metacarpal joint

FIG. 134.—POSTERIOR VIEW OF WRIST.—(*Morris.*)

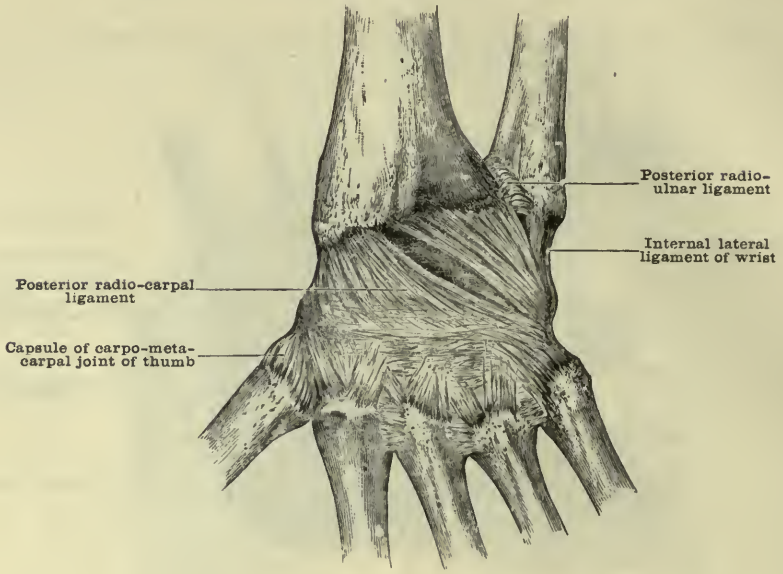

Posterior radio-ulnar ligament
Internal lateral ligament of wrist
Posterior radio-carpal ligament
Capsule of carpo-metacarpal joint of thumb

FIG. 135.—ANTERIOR AND POSTERIOR VIEW OF LIGAMENTS OF THE FINGERS.—(*Morris.*)

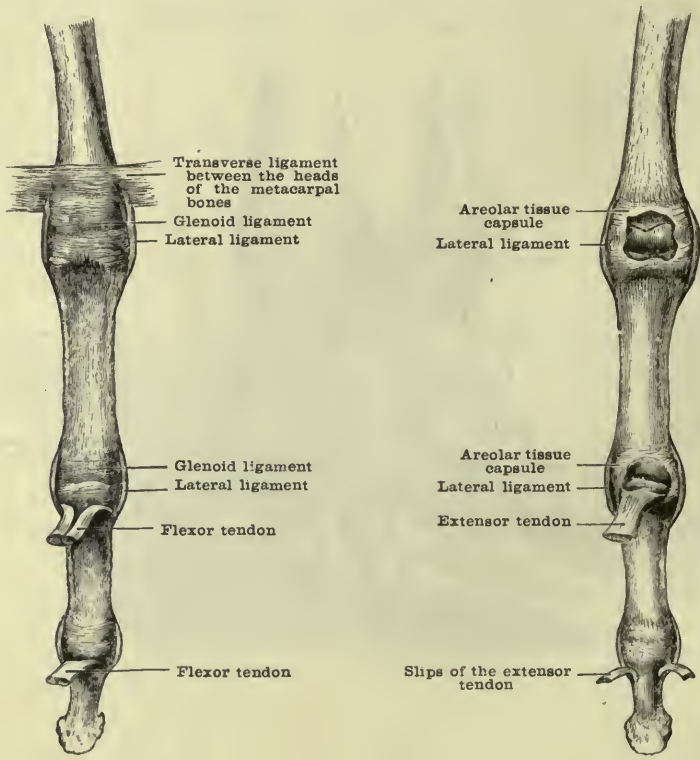
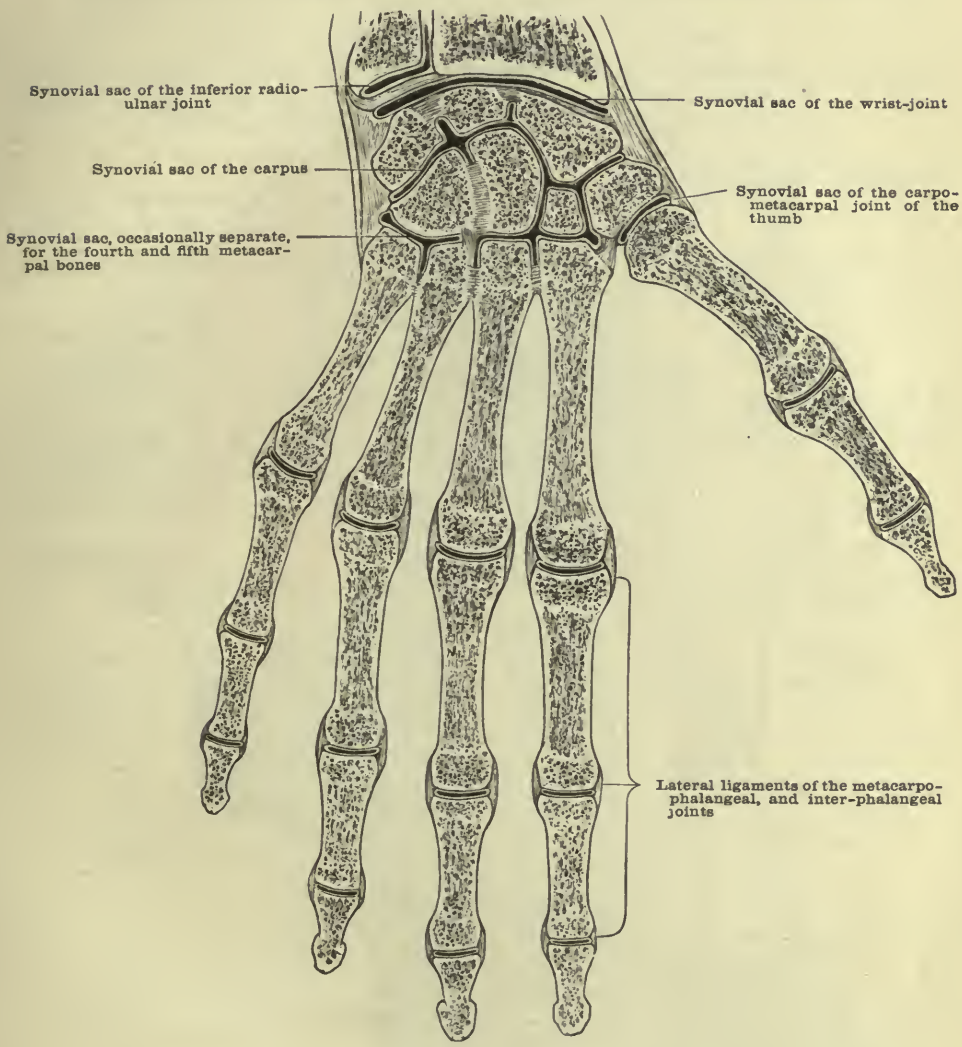


FIG. 136.—SYNOVIAL MEMBRANES OF WRIST, HAND, AND FINGERS.—(*Morris.*)


Synovial sac of the inferior radio-ulnar joint
Synovial sac of the carpus
Synovial sac, occasionally separate, for the fourth and fifth metacarpal bones
Synovial sac of the wrist-joint
Synovial sac of the carpo-metacarpal joint of the thumb
Lateral ligaments of the metacarpo-phalangeal, and inter-phalangeal joints

Study the nerve- and blood-supply of each joint.

Showing the cutaneous nerve supply of the body.

FIG. 137.—DIAGRAM OF THE CUTANEOUS NERVE AREAS OF THE HEAD AND NECK.—(*Morris.*)

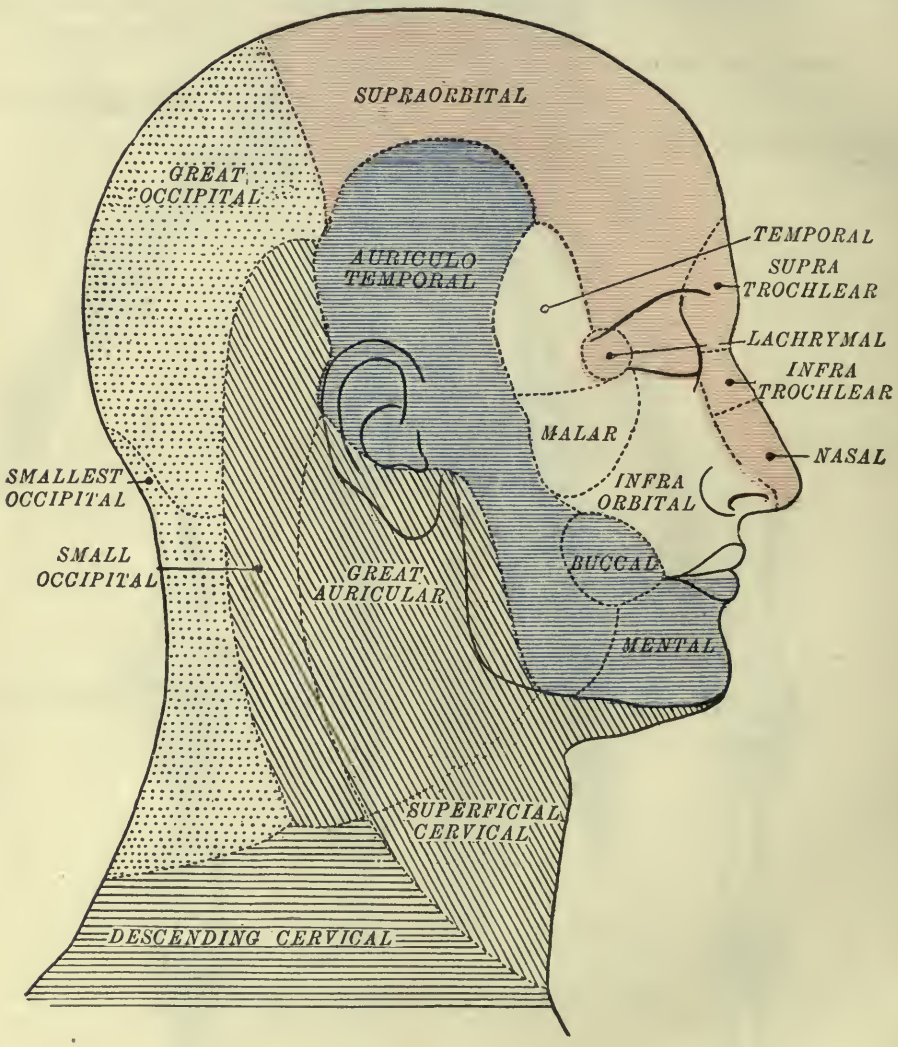
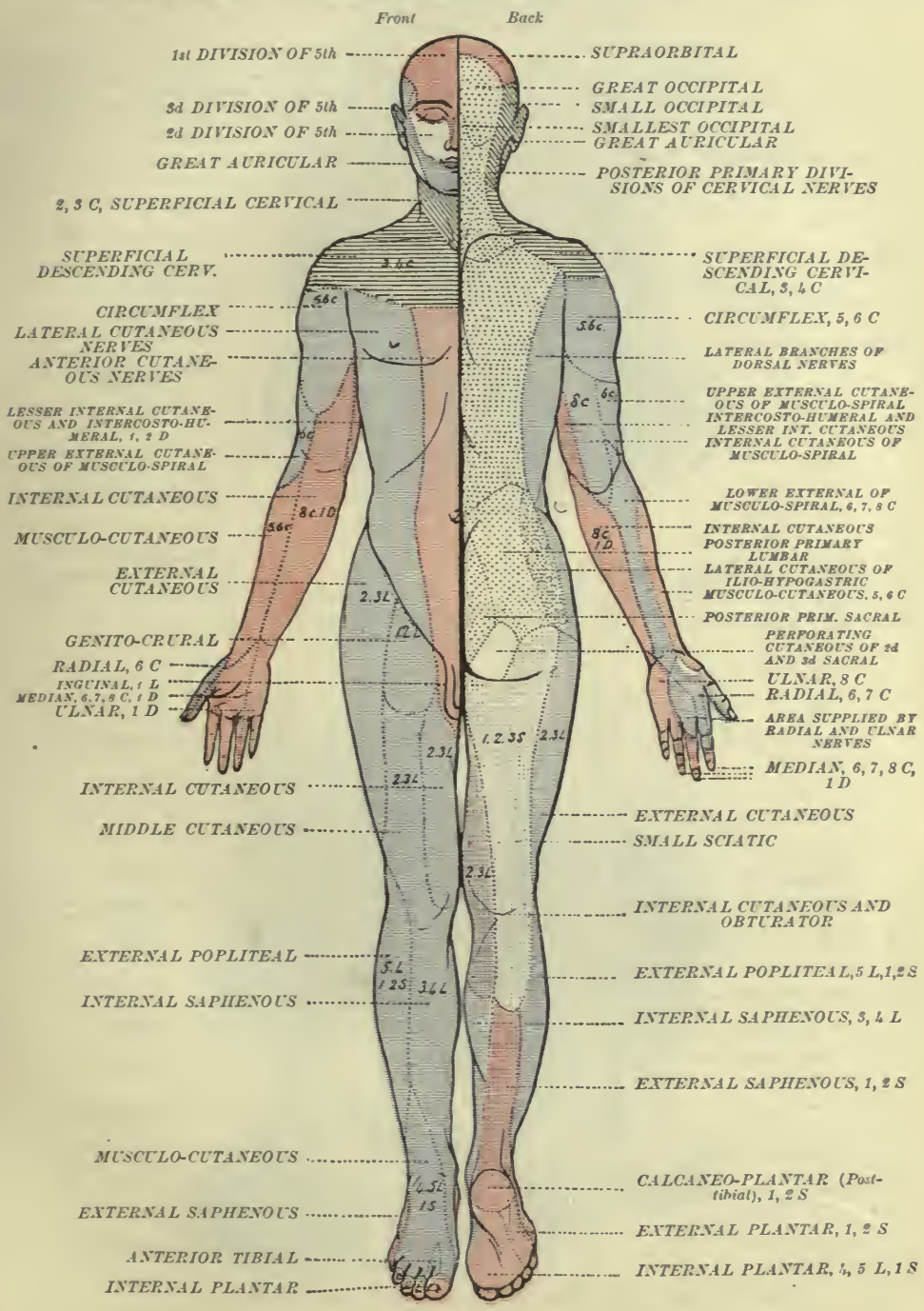


FIG. 138.—DIAGRAM SHOWING THE AREAS OF DISTRIBUTION OF CUTANEOUS NERVES.—(*Morris.*)

HEAD:—
Red—First division of fifth. White—Second division of fifth. Blue—Third division of fifth. Dark area—Posterior primary divisions of cervical nerves. Oblique and transverse shading—Branches of cervical plexus.

BODY AND LIMBS:—
Red—Anterior divisions of anterior primary branches. Blue—Posterior divisions of anterior primary branches. Two colors in one area indicate that the area is supplied by two sets of nerves, and it should be understood that wherever two nerve areas approach each other they overlap. The dotted blue area of small sciatic indicates that the nerve comes from the posterior as well as from the anterior parts of anterior primary divisions of sacral nerves, but it supplies a flexor area. The area of the perforating cutaneous nerve is left uncoloured because its true nature is uncertain. Dark shading—Posterior primary divisions. The numbers and initial letters refer to the nerve-roots from which the nerves are derived.



An examination of the following figures will help to understand and remember the relative positions of the structures exposed by the sections.

FIG. 139.—SECTION OF NECK THROUGH THE SIXTH CERVICAL VERTEBRA. (One-half.) (Braune.) (*Morris.*)

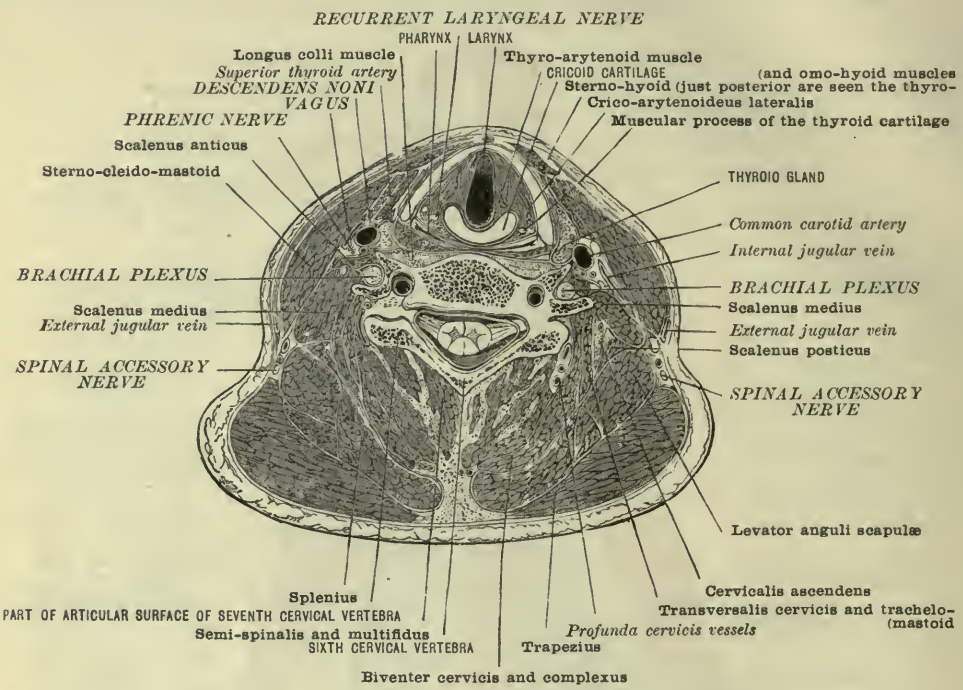


FIG. 140.—DIAGRAM SHOWING RELATION OF KIDNEY TO CAPSULE.—(*Morris.*)

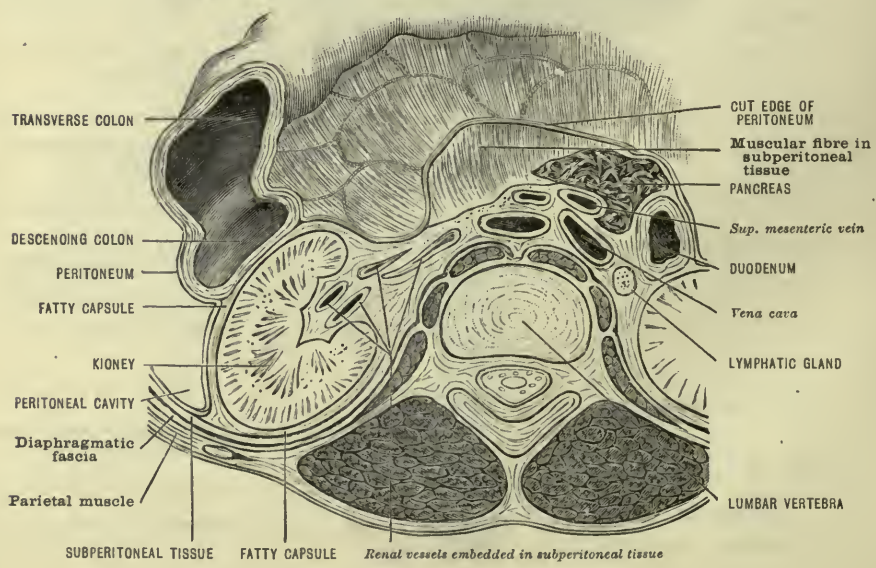


FIG. 141.—TRANSVERSE SECTION OF THE ABDOMEN THROUGH THE KIDNEYS AND PANCREAS, AT THE LEVEL OF THE FIRST LUMBAR VERTEBRA. (Braune.) (*Morris.*)

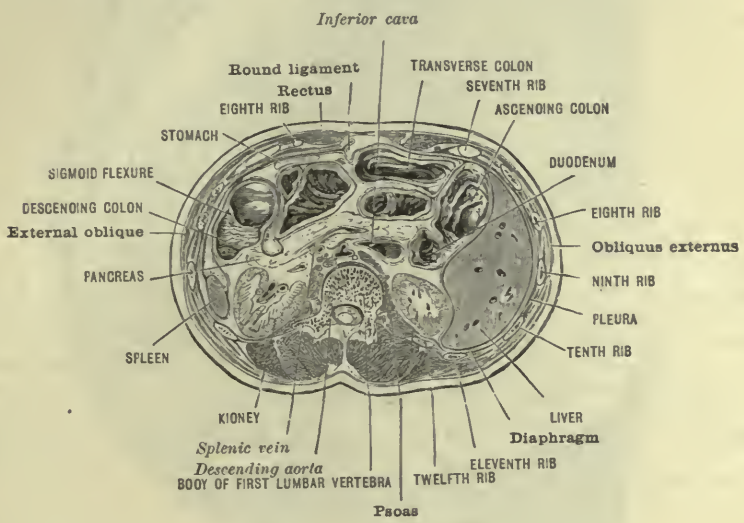


FIG. 142.—SAGITTAL SECTION OF MALE PELVIS IN THE MESIAL LINE. (One-third.) (Braune.) (*Morris.*)

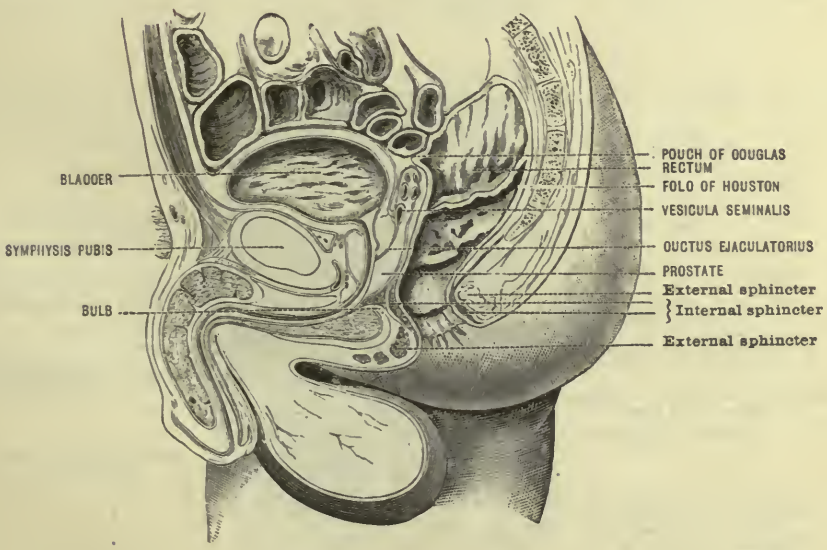


FIG. 143.—SECTION OF THE FEMALE PELVIS. (After Henle.) (*Morris.*)

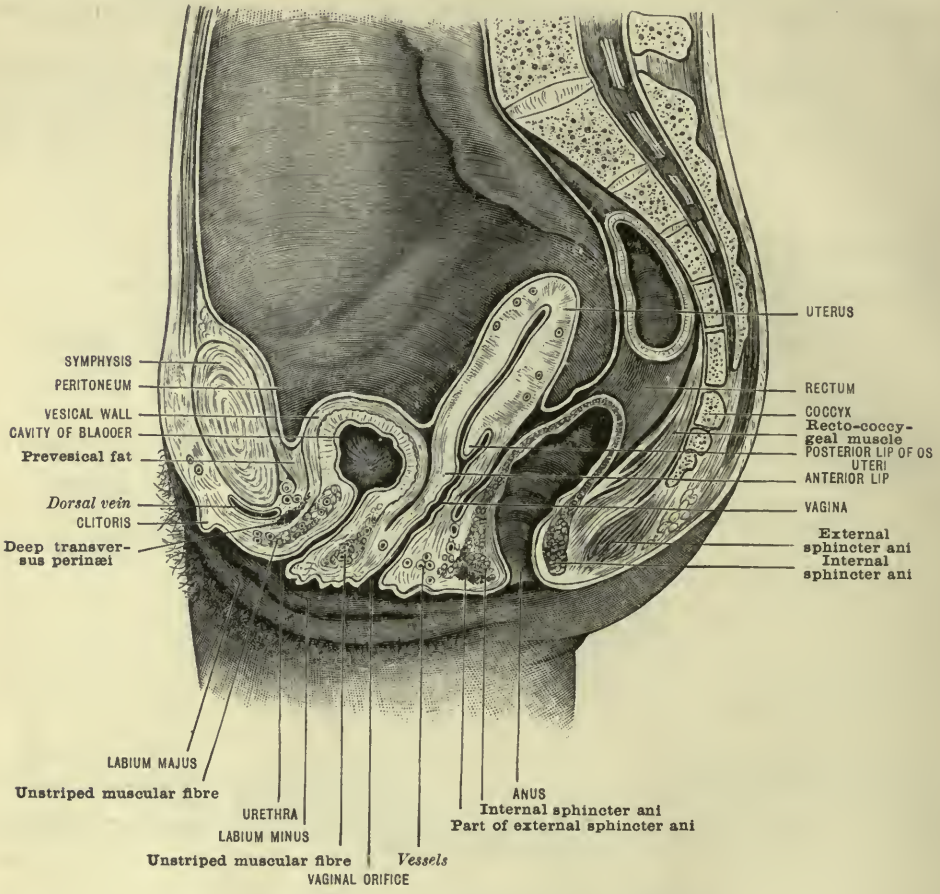


FIG. 144.—SECTION SHOWING THE ISCHIO-RECTAL FOSSA IN ITS RELATIONS TO THE PELVIC VISCERA.—(*Morris.*)

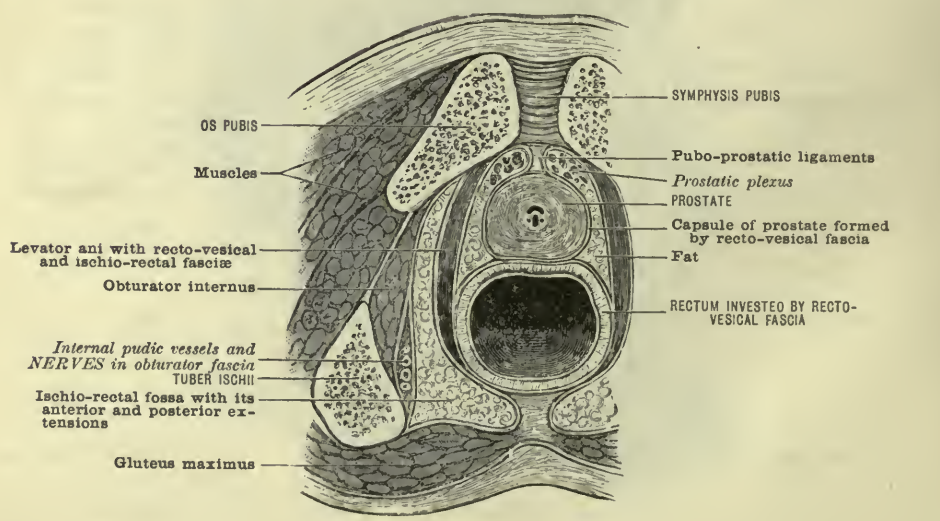


FIG. 145.—TRANSVERSE SECTION THROUGH THE RIGHT SHOULDER-JOINT, SHOWING THE STRUCTURES IN CONTACT WITH IT. (Braune.) (*Morris.*)

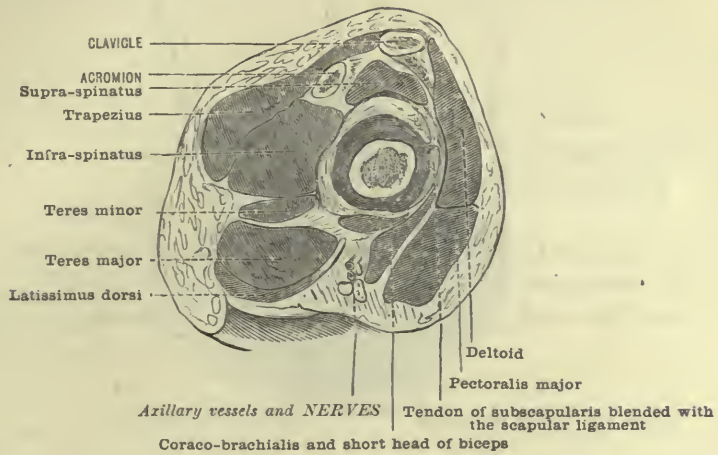


FIG. 146.—DIAGRAMMATIC SECTION OF SHOULDER THROUGH BICIPITAL GROOVE. (Anderson.) (*Morris.*)

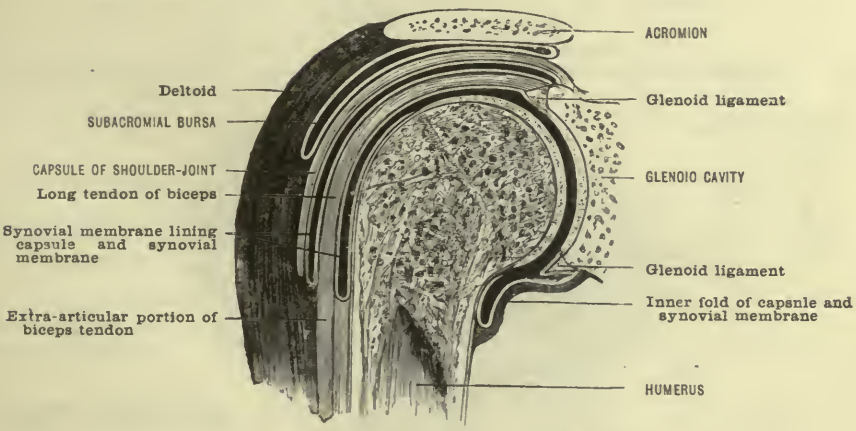


FIG. 147.—SECTION THROUGH THE MIDDLE OF THE RIGHT UPPER ARM. (Heath.) (*Morris.*)

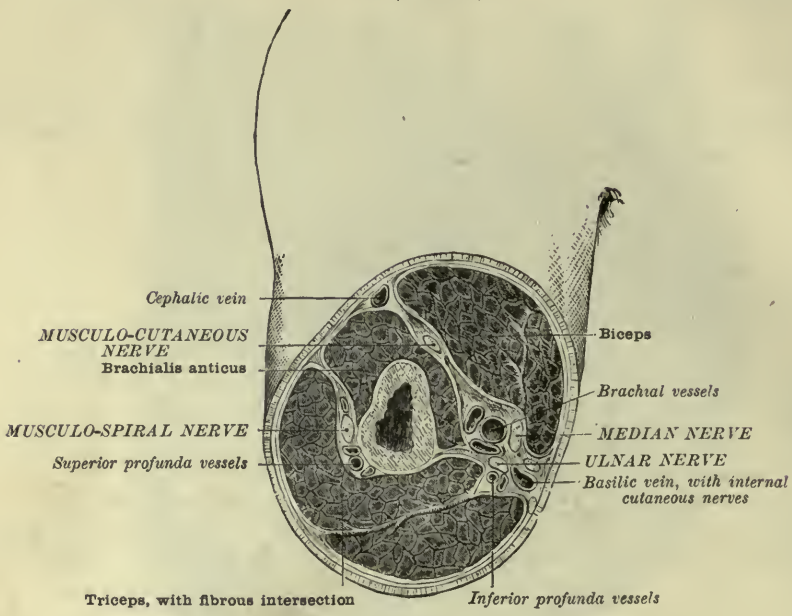


FIG. 148.—VERTICAL SECTION OF THE ELBOW. (One-half.) (Braune.) (*Morris.*)

FIG. 149.—LONGITUDINAL SECTION OF THE ELBOW-JOINT. (One-half.) (Braune.) (*Morris.*)

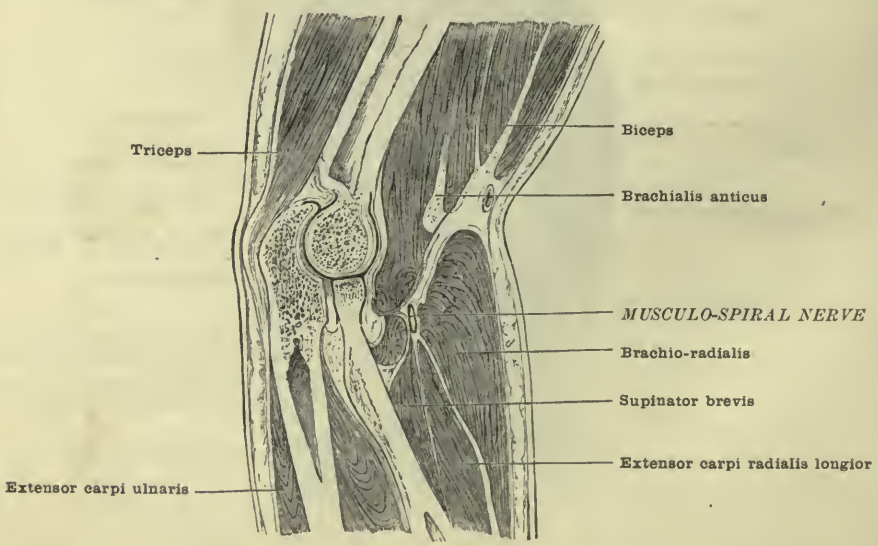


FIG. 150.—SECTION THROUGH THE MIDDLE OF THE RIGHT FOREARM. (Heath.) (*Morris.*)

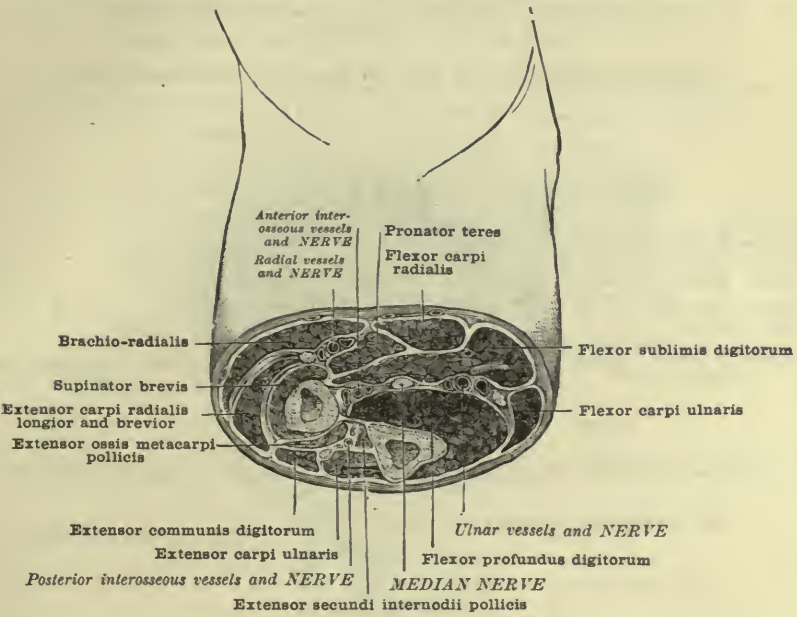


FIG. 151.—SECTION THROUGH REGION OF WRIST, A LITTLE ABOVE THE JOINT. RIGHT SIDE, UPPER HALF OF THE SECTION. (Tillaux.) (*Morris.*)

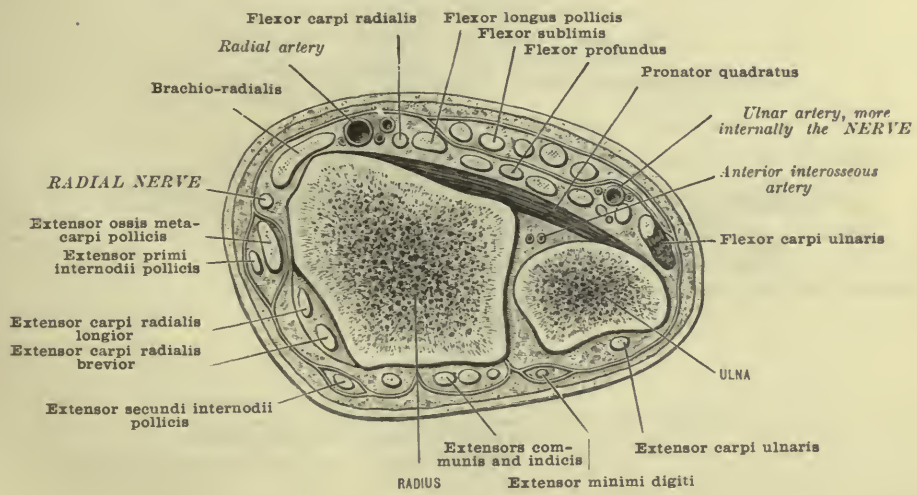


FIG. 152.—TRANSVERSE SECTION OF THE WRIST, THROUGH THE MIDDLE OF THE PISIFORM BONE.—(*Morris.*)

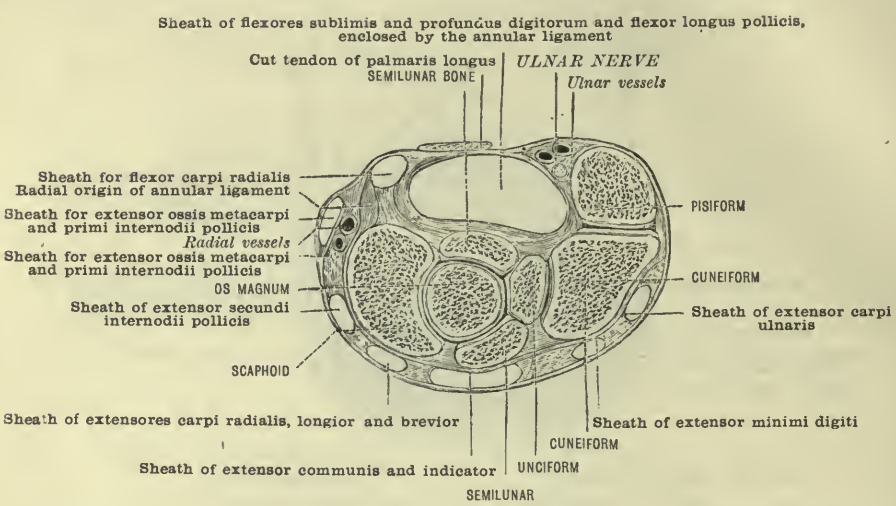

Sheath of flexores sublimis and profundus digitorum and flexor longus pollicis, enclosed by the annular ligament
Cut tendon of palmaris longus
SEMILUNAR BONE
ULNAR NERVE
Ulnar vessels
Sheath for flexor carpi radialis
Radial origin of annular ligament
Sheath for extensor ossis metacarpi and primi internodii pollicis
Radial vessels
Sheath for extensor ossis metacarpi and primi internodii pollicis
OS MAGNUM
Sheath of extensor secundi internodii pollicis
SCAPHOID
PISIFORM
CUNEIFORM
Sheath of extensor carpi ulnaris
Sheath of extensores carpi radialis, longior and brevior
Sheath of extensor communis and indicator
CUNEIFORM
UNCIFORM
SEMILUNAR
Sheath of extensor minimi digiti

FIG. 153.—SECTION OF CARPUS, THROUGH THE UNCIFORM BONE. (Two-thirds.) (Bellamy after Henle.) (*Morris.*)

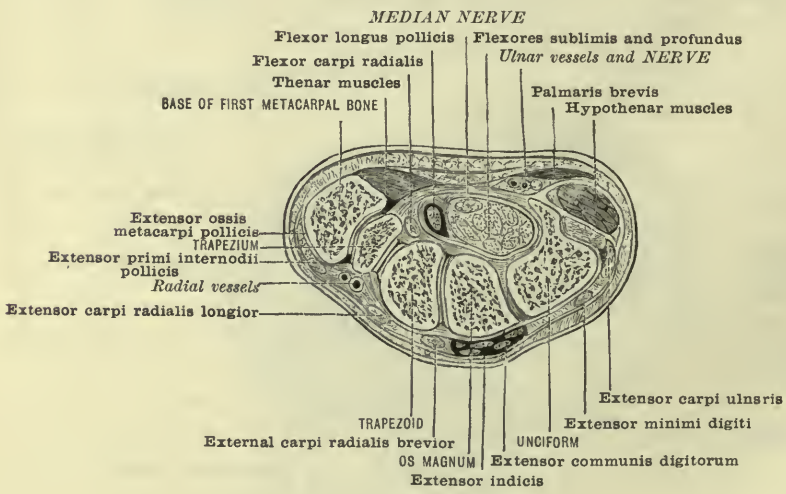


FIG. 154.—HORIZONTAL SECTION OF THE HAND THROUGH THE CARPO-METACARPAL JOINTS. (Bellamy after Henle.) (*Morris.*)

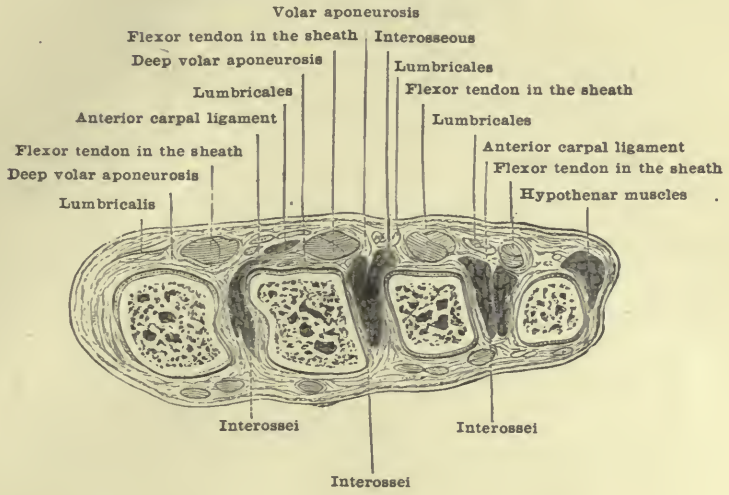
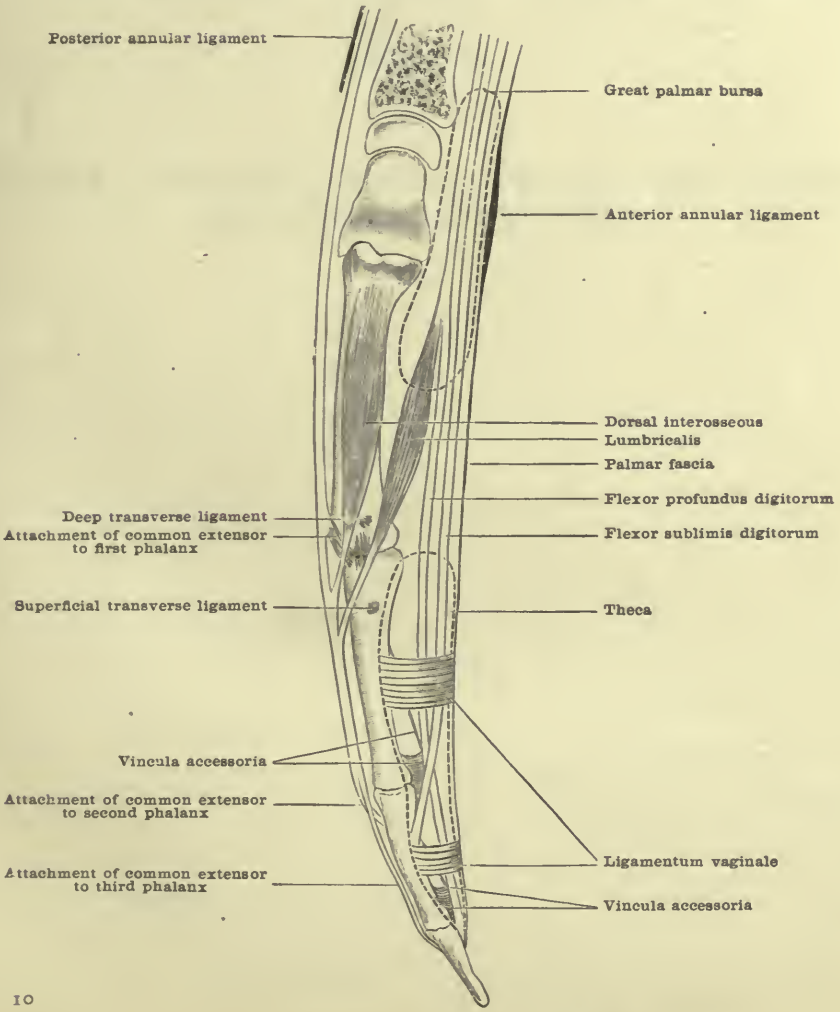


FIG. 155.—DIAGRAM OF A VERTICAL SECTION THROUGH THE MIDDLE OF THE HAND.—(*Morris.*)



PART II.

ABDOMEN, ABDOMINAL VISCERA, PELVIS, PELVIC VISCERA, AND LOWER EXTREMITIES.

DEMONSTRATION I.

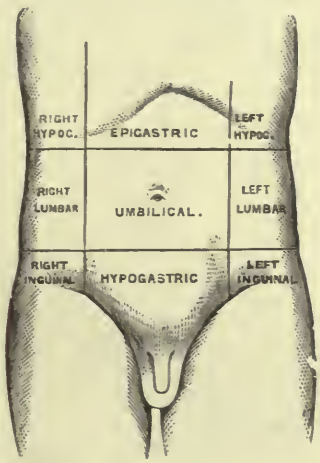
THE ABDOMEN.

Surface Anatomy.—Umbilicus, linea alba, recti muscles, and linea semilunaris, should be located. The external abdominal ring can be felt above and external to the spine of the pubis. Passing from the spine of os pubis to the anterior superior spine of the ilium is Poupart's ligament.

The external abdominal ring in the male can be felt by passing your finger along the spermatic cord beginning at the testes.

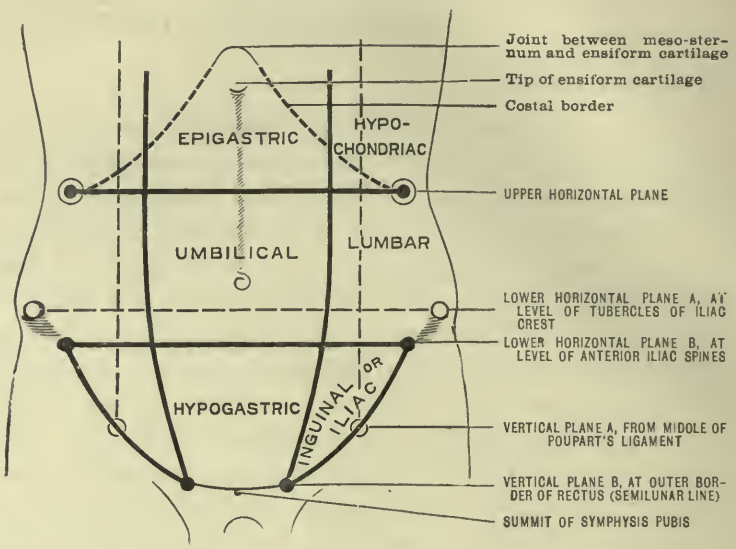
In order that the viscera in the abdomen may be more easily located the abdomen is divided into regions by drawing one line horizontally across the abdomen on a level with the cartilages of the ninth ribs; another on a level with the anterior superior spines of the ilia. Then draw a vertical line on each side from the cartilages of the eighth ribs to the middle of Poupart's ligament. This divides the abdomen into epigastric, umbilical, hypogastric, right and left hypochondrium, right and left lumbar, right and left inguinal regions.

FIG. 156.—(*Holden.*)



Another division can be made, shown in figure 157, from Morris:—

FIG. 157.—DIAGRAM OF THE ABDOMINAL REGIONS.—(*Morris.*)


Joint between meso-sternum and ensiform cartilage
Tip of ensiform cartilage
Costal border
EPIGASTRIC
HYPO-CHONDRIAC
UPPER HORIZONTAL PLANE
UMBILICAL
LUMBAR
LOWER HORIZONTAL PLANE A, AT LEVEL OF TUBERCLES OF ILIAC CREST
LOWER HORIZONTAL PLANE B, AT LEVEL OF ANTERIOR ILIAC SPINES
HYPOGASTRIC
INGUINAL OR ILIAC
VERTICAL PLANE A, FROM MIDDLE OF POUPART'S LIGAMENT
VERTICAL PLANE B, AT OUTER BORDER OF RECTUS (SEMILUNAR LINE)
SUMMIT OF SYMPHYSIS PUBIS

What viscera are in each region?

DEMONSTRATION II.

ABDOMINAL WALLS.

Make a circular incision through the skin around the umbilicus one and one-half inches in diameter; turn the skin toward the umbilicus. This serves to hold a string. Now make a puncture through the umbilicus, insert a blow-pipe, distend the abdomen with air, remove blow-pipe, and draw the string tight.

Dissection.—Make an incision through the skin from the ensiform cartilage to the os pubis, another midway between the umbilicus and os pubis, transversely outward to the anterior superior iliac spine and along the crest of the ilium to its posterior third. Another from the umbilicus upward and outward to the sixth rib. Dissect off the skin, exposing the **superficial fascia.**

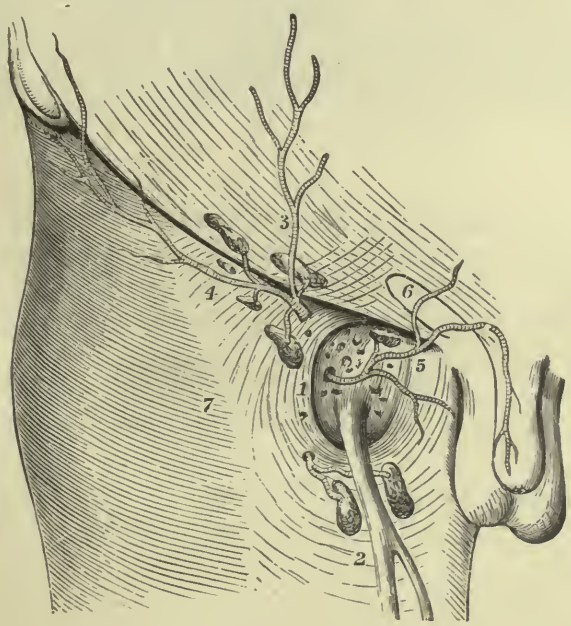
Study the **superficial fascia** and note in it the following:—

Superficial arteries (Fig. 158):—

Superficial epigastric.
Superficial circumflex iliac.
Superficial external pudic.

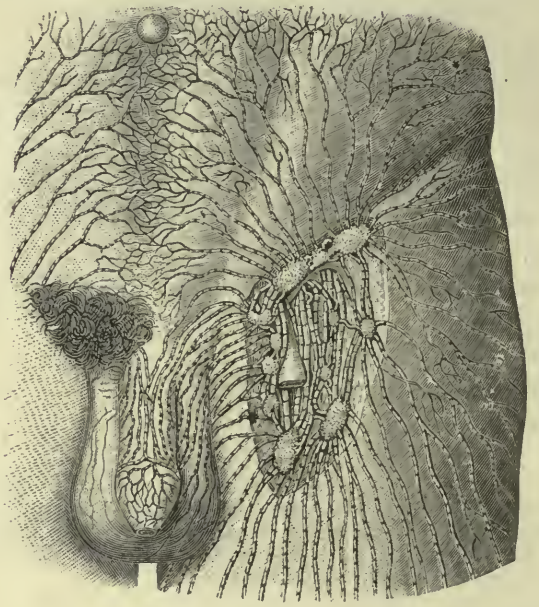
FIG. 158.—SUPERFICIAL VESSELS AND GLANDS OF THE GROIN.—(*Holden.*)

1. Saphenous opening of the fascia lata. 2. Saphena vein. 3. Superficial epigastric a. 4. Superficial circumflexa ilii a. 5. Superficial external pudic a. 6. External abdominal ring. 7. Fascia lata of the thigh.



Superficial nerves (see Fig. 81):—
Lower dorsal.
Ilio-hypogastric.
Ilio-inguinal.
Superficial lymphatics.

FIG. 159.—LYMPHATIC VESSELS AND GLANDS OF THE GROIN.—(*Holden.*)



Dissect the skin down only one inch below Poupart's ligament. Do not go onto the thigh.

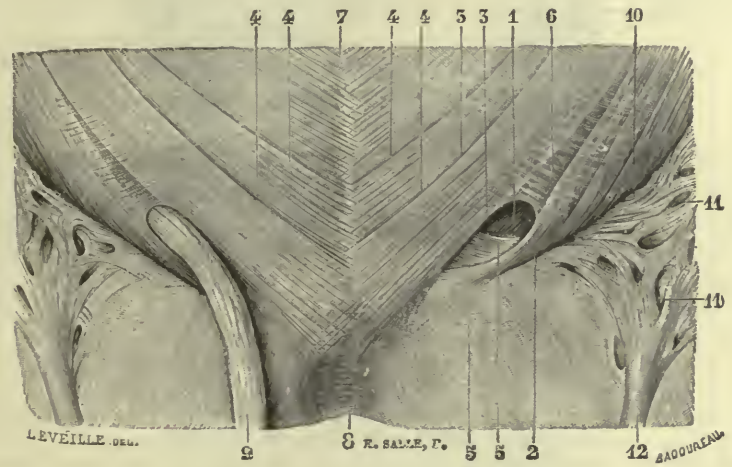
Expose the external abdominal muscle.

Carefully locate and study Poupart's ligament.

Locate and study the external abdominal ring, noting its position and its boundary. Note spermatic cord or round ligament. Feel the opening by pushing your finger up along the spermatic cord into the ring.

FIG. 160.—POUPART'S LIGAMENT. THE APONEUROSIS OF THE EXTERNAL OBLIQUE AND THE EXTERNAL ABDOMINAL RING.—(*Holden.*)

1. External abdominal ring. 2. Its inferior or external pillar, curvilinear, attached to the spine of the pubis. 3, 3. Its superior or internal straight pillar, prolonged to the median line attached to the symphysis pubis. and interlacing with the one of the opposite side. 4, 4. Ligament of Colles, situated behind the preceding pillar and interlacing with it, attached to the crest of the pubis of the opposite side, thus forming an internal pillar. 5, 5. Attachment of Colles' ligament. 6. Arched fibers connecting the internal and external pillars, forming the external boundary of the ring. 7. Linea alba. 8. Symphysis pubis. 9. Spermatic cord. 10. Poupart's ligament. 11, 11. Cribriform fascia. 12. Internal saphenous vein.



Study the **external abdominal muscle** and then detach it by cutting it halfway between its origin and the linea semilunaris; turn it outward, and inward to the linea semilunaris. Do not destroy Poupart's ligament, but make an incision about one-half inch above the lower border of the aponeurosis of the external oblique and parallel with its lower border, thus making Poupart's ligament.

Study the **internal oblique muscle** and then detach this muscle the same as the external oblique.

Observe the fibres of the **cremaster muscle,** the **conjoined tendon** and **triangular fascia.** (See Figs. 161 and 162.)

FIG. 161.—DISSECTION OF INGUINAL CANAL. (Wood.) (*Morris.*)

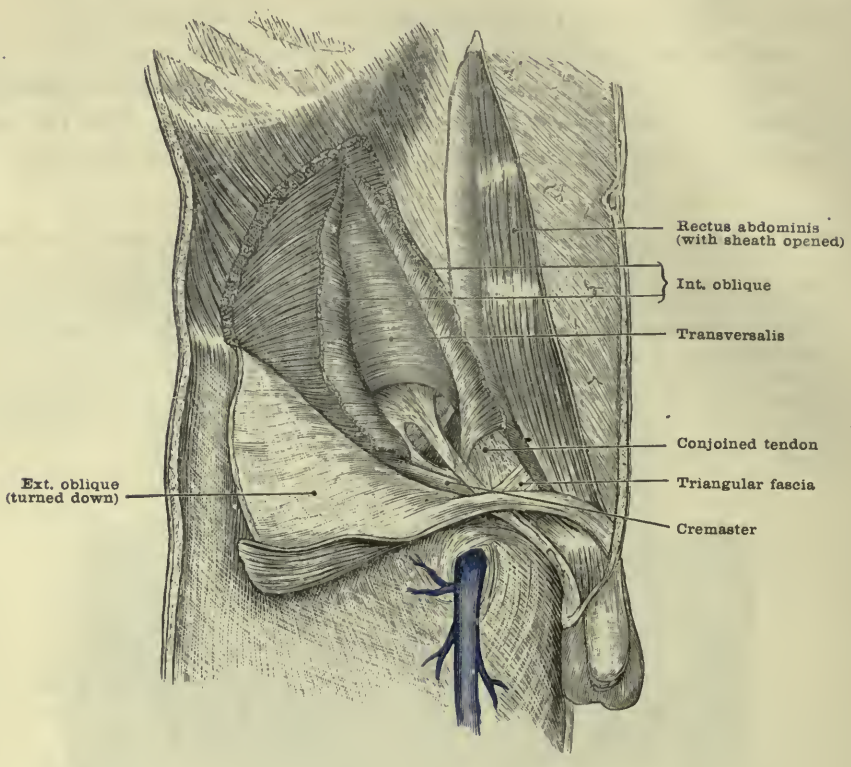


FIG. 162.—DIAGRAM OF THE LOWER FIBRES OF THE INTERNAL OBLIQUE AND TRANSVERSALIS, WITH THE CREMASTER MUSCLE.—(*Holden.*)

1. Conjoined tendon of internal oblique and transversalis. 2. Cremaster muscle passing down in loops over the cord.

Locate the **internal abdominal ring;** study its boundary. (See Fig. 161.)

What is the inguinal canal?

Study the **transversalis muscle** and detach it same as the oblique muscles. (See Fig. 161.)

Observe the transversalis fascia and note that the internal abdominal ring is bounded by this fascia. Note the spermatic cord in the male and the round ligament in the female as they pass along the inguinal canal.

Expose the **rectus abdominis muscle** by cutting through its sheath lengthwise. Note the linea transversæ. (See Fig. 163.)

What forms the **sheath** of rectus abdominis muscle?

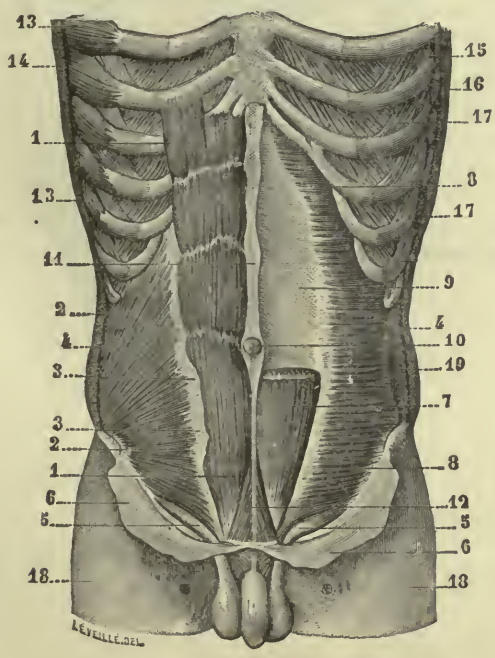
Observe and study the **pyramidalis muscle.**

Study **rectus abdominis** muscle and then cut it across at the umbilicus and turn it upward and downward. Observe in the muscle above the umbilicus the **superior epigastric** artery, and in the sheath behind the muscle below the umbilicus the **deep epigastric** artery. Note the relation of the deep epigastric to the internal abdominal ring. (See Fig. 165.)

Also observe the **plica semilunaris,** or fold of Douglas.

FIG. 163 —DEEP MUSCLES OF THE ABDOMINAL WALL.—(*Holden.*)

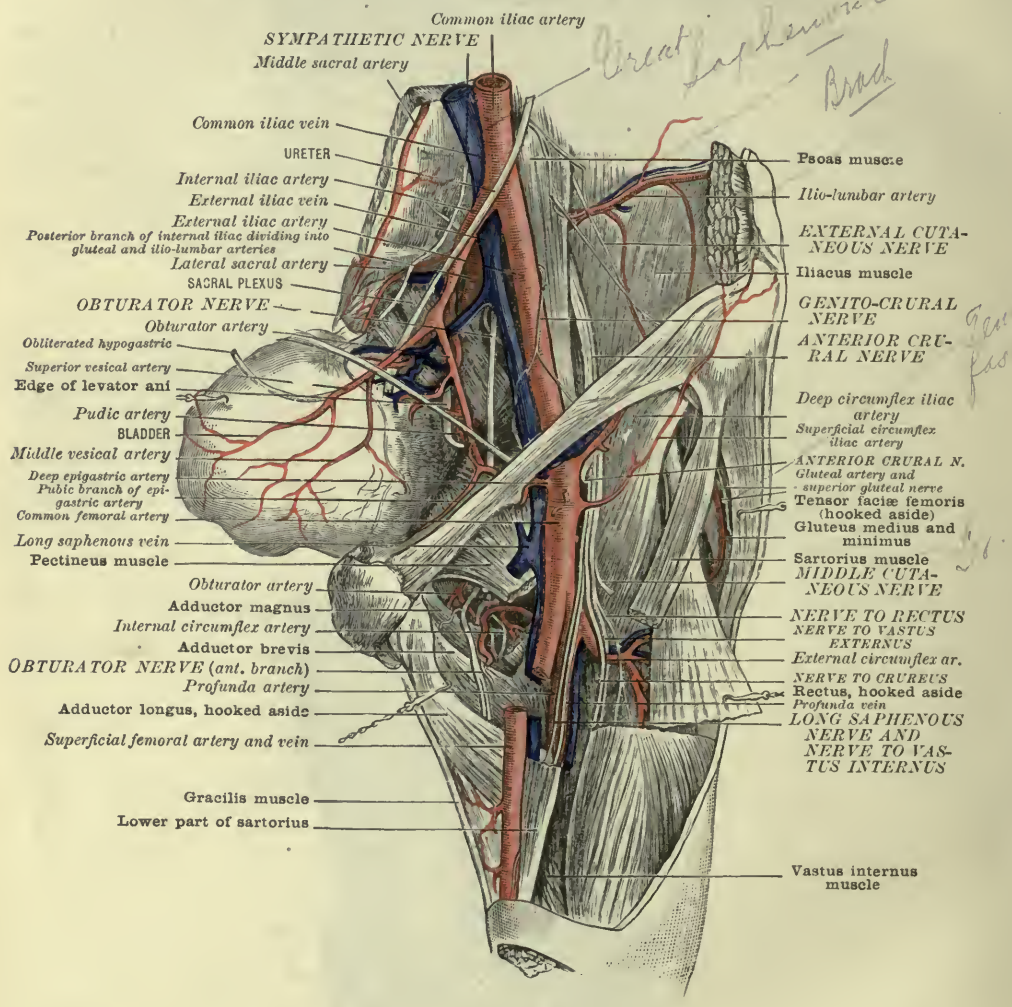
1. Rectus abdominis. 2, 2. Internal oblique. 3, 3. Anterior leaflet of the aponeurosis of the internal oblique. 4, 4. Cut external oblique. 5, 5. Spermatic cord. 6, 6. Inferior part of the external oblique aponeurosis turned back on the thigh. 7. Rectus abdominis; the upper part has been excised to show the aponeurosis of the transversalis. 8, 8. Fleshy portion of this muscle. 9. Its aponeurosis. 10. Umbilicus. 11. Linea alba above umbilicus. 12. Infraumbilical linea alba separating below the two pyramidales. 13, 13. Serratus magnus. 14. Cut right latissimus dorsi. 15. Cut left latissimus dorsi. 16. Cut serratus magnus. 17, 17. External intercostals, 18, 18. Femoral aponeurosis. 19. Cut internal oblique.



Deep arteries of abdomen:—

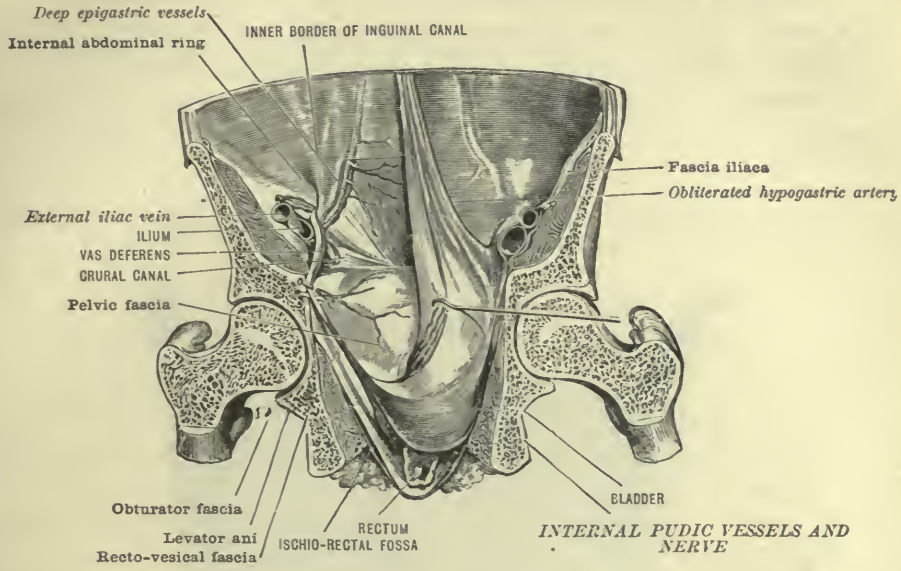
Deep epigastric (*A. epigastrica inferior*).
Deep circumflex iliac.
Superior epigastric.
Intercostalis,—lower.
Lumbar,—terminal branches.

FIG. 164.—SIDE VIEW OF PELVIS AND UPPER THIRD OF THIGH, WITH THE EXTERNAL ILIAC, INTERNAL ILIAC, AND FEMORAL ARTERIES AND THEIR BRANCHES, LEFT SIDE.—(*Morris.*)
(From a dissection by W. J. Walsham in the Museum of St. Bartholomew's Hospital.)
The bladder is hooked over to expose back of pelvis.



Study carefully the anatomy concerned in inguinal hernia. (See Figs. 161 and 165.)

FIG. 165.—POSTERIOR PART OF LOWER WALL OF ABDOMEN WITH THE DIFFERENT STRUCTURES ON IT. (Blandin.) (*Morris.*)



DEMONSTRATION III.

ABDOMINAL CAVITY.

General description; boundaries.

Open the *abdomen* by making an incision through the transversalis fascia and peritoneum, lying below it, a little to the left of the median line and extending from the ensiform cartilage to a level of the umbilicus. From this point make an incision on each side extending obliquely outward to the anterior superior spine of the ilium.

Examine the inner surface below the umbilicus and note:—

Urachus.

Hypogastric artery—obliterated.

Fossæ.

(See Fig. 165.)

CONTENTS OF ABDOMEN.

Study the position of each viscus, noting the relations to each other and to external landmarks:—

Stomach:—Shape, position in abdomen, and relation to surrounding parts.

Liver:—Position in relation to ribs, stomach, colon, and kidney.

Large Intestines:—Relation to small intestines, liver, spleen, kidney, and stomach.

Small Intestines:—Duodenum, jejunum, ileum, junction with large intestines.

Vermiform Appendix:—Relation to cæcum.

Kidney:—Position as to crest of ilium, ribs, and vertebræ.

Spleen:—Relation to ribs, colon, stomach, and pancreas.

Pancreas:—Relation to stomach, duodenum, and superior mesentery artery.

FIG. 166.—THE VISCERA AS SEEN ON FULLY OPENING THE ABDOMEN WITHOUT DISARRANGEMENT OF THE INTERNAL PARTS. (After Sarazin.) (*Morris.*)

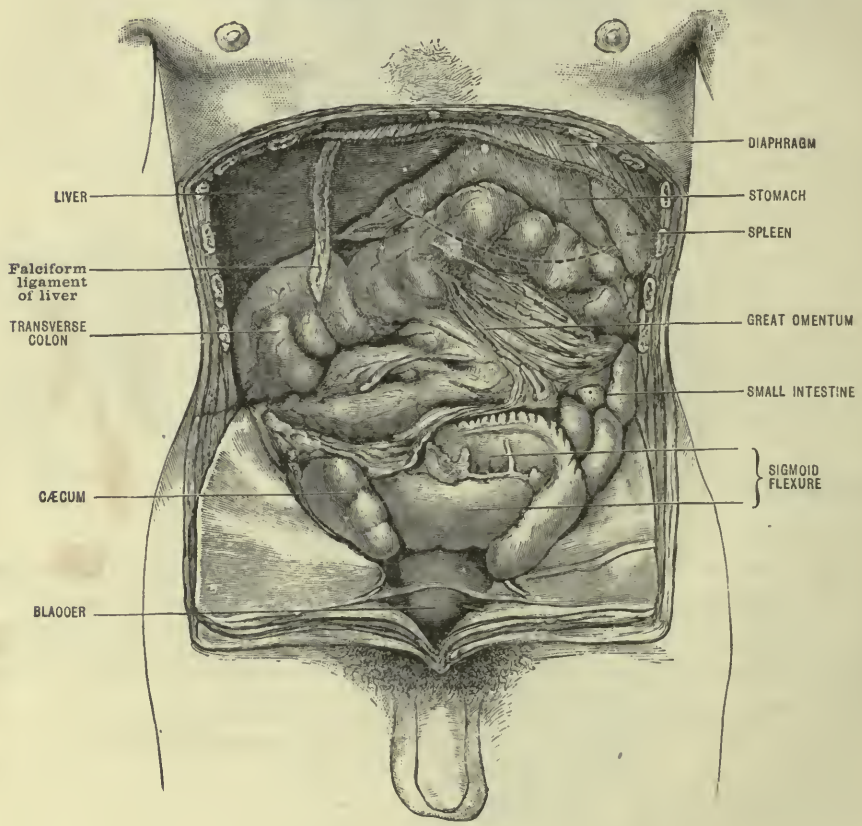


FIG. 167.—VIEW OF THE DEEPER ABDOMINAL VISCERA. (Rüdinger.) (*Morris.*)

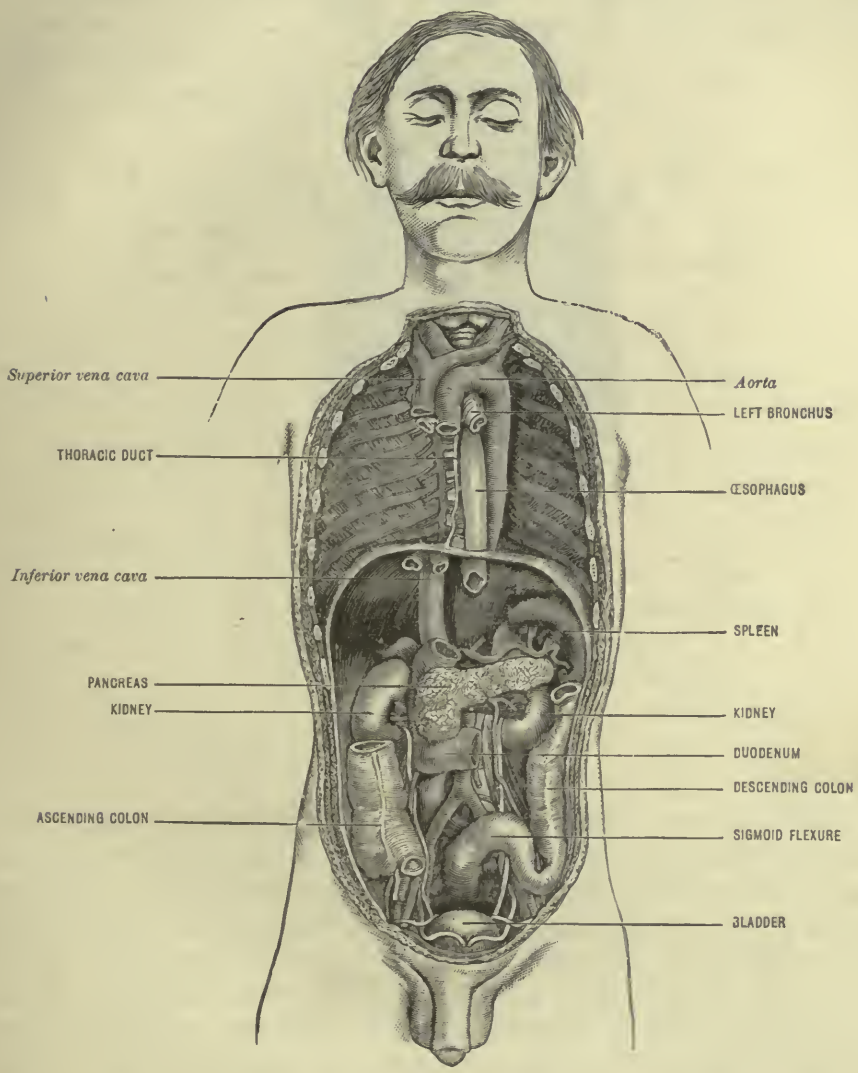
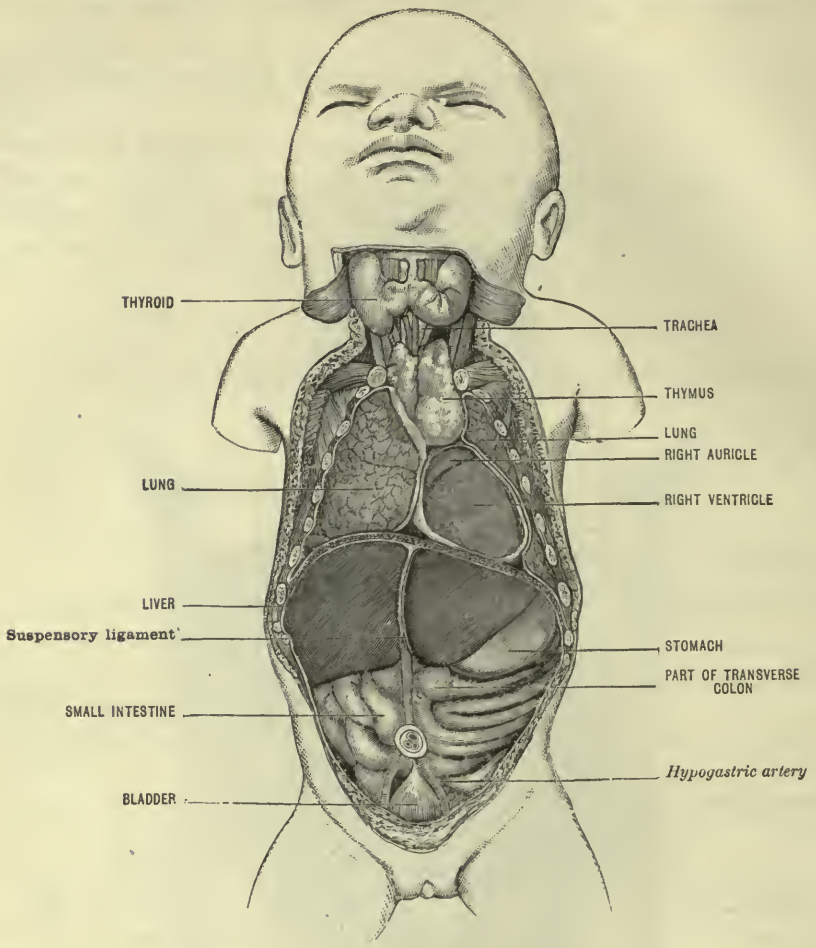


FIG. 168.—THE VISCERA OF THE FŒTUS. (Rüdinger) (*Morris.*)



PERITONEUM.

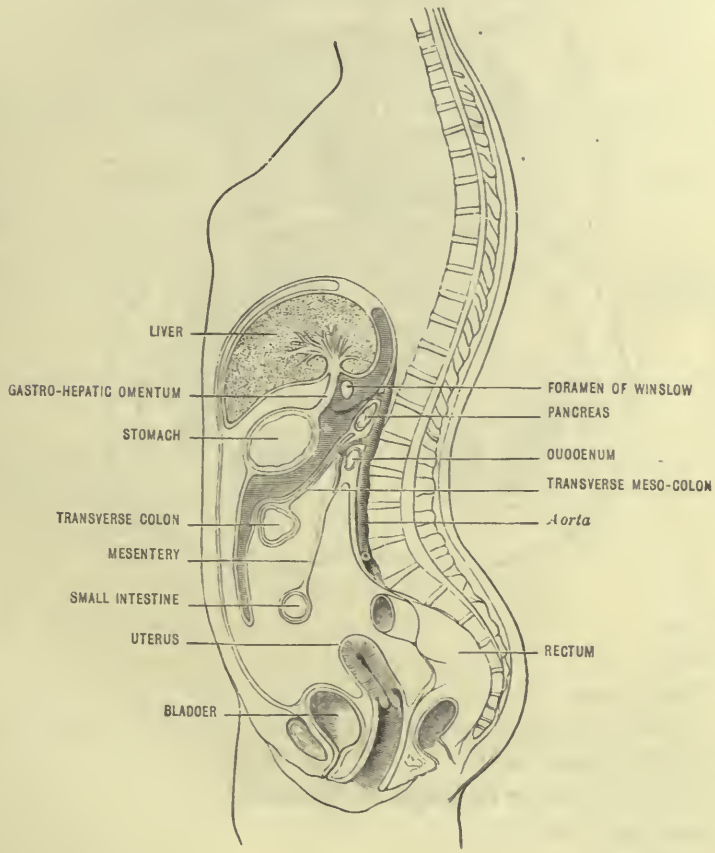
General character. The following is taken from Holden's "Anatomy": —"A certain range of motion being necessary to the abdominal viscera, they are provided with a serous membrane, called *peritoneum*. This membrane, like other serous membranes, is a closed sac, one part of which lines the containing cavity, the other is reflected over the containing viscera. These are respectively termed the parietal and the visceral layers. In the female, however, it is not, strictly speaking, a closed sac, since it communicates with the cavity of the uterus through the Fallopian tubes. The internal surface of the peritoneum is smooth and polished, and lined by squamous endothelium; the external surface—the subperitoneal tissue—is composed of areolar tissue, which connects the internal layer to the invested viscera or abdominal parietes. There is nothing between the parietal and visceral layers—in other words, inside the sac—but just sufficient moisture to lubricate its smooth and polished surface. The viscera are all, more or less, outside the sac; some lie altogether behind it, as the

pancreas, kidneys, suprarenal capsule; others, as the lower parts of the duodenum, cæcum, ascending and descending colon, are only partially covered by it; while others, as the stomach, liver, jejunum, ileum, and some parts of the large intestines, are completely invested by it; these latter push the visceral layer before them, and so give rise to membranous folds; the larger the fold, the freer is the mobility of the viscus which occasions it."

To properly understand the peritoneum a knowledge of its formation is necessary. The student should therefore study some good description of the development of the peritoneum.

Trace the peritoneum vertically.

FIG. 169.—DIAGRAM TO SHOW THE PERITONEUM AS SEEN IN A VERTICAL SECTION. (Allen Thomson.) (*Morris.*)



Trace the peritoneum in transverse sections at different levels, using the figures below as guides.

FIG. 170.—TRANSVERSE SECTION OF THE PERITONEAL SAC AT ABOUT THE LEVEL OF THE UMBILICUS.—(*Morris.*)

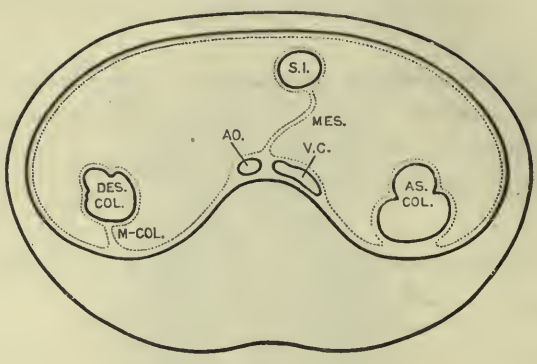
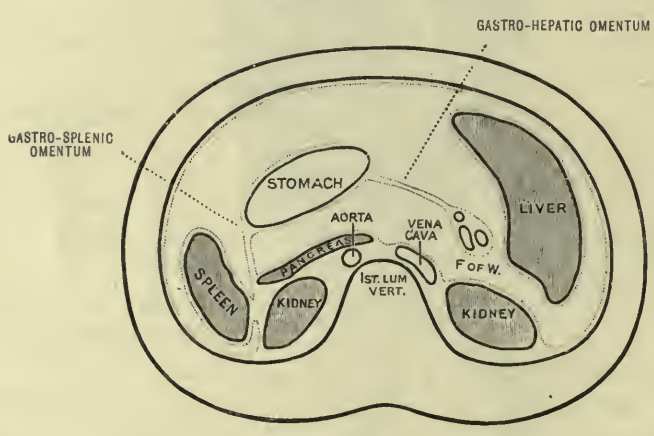


FIG. 171.—TRANSVERSE SECTION OF THE ABDOMEN AT THE LEVEL OF THE FORAMEN OF WINSLOW.—(*Morris.*)



Greater sac.

Lesser sac.

Trace each.

What viscera, and what parts of what viscera are covered by the greater sac; what by the lesser sac?

Where and what is the **foramen of Winslow?**

Great omentum (Fig. 175).

Position.

Description.

Lesser omentum or gastro-hepatic.

Position.

Description.

Gastro-splenic omentum.

Position.

Gastro-phrenic ligament.

Position.

Phreno-colic ligament.

Position.

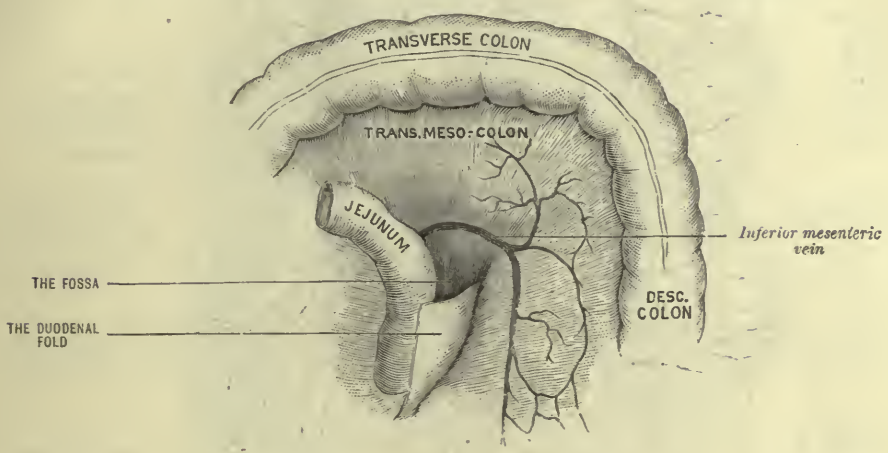
Peritoneal ligaments connected with the liver, bladder, and uterus are described with those organs.

There are several pouches formed in the development of the peritoneum which may become the seat of intra-abdominal herniæ. Locate these.

They are named from their positions:—

Fossa duodeno-jejunalis. (See Fig. 172.)

FIG. 172.—THE FOSSA DUODENO-JEJUNALIS. (Treves.) (*Morris.*)



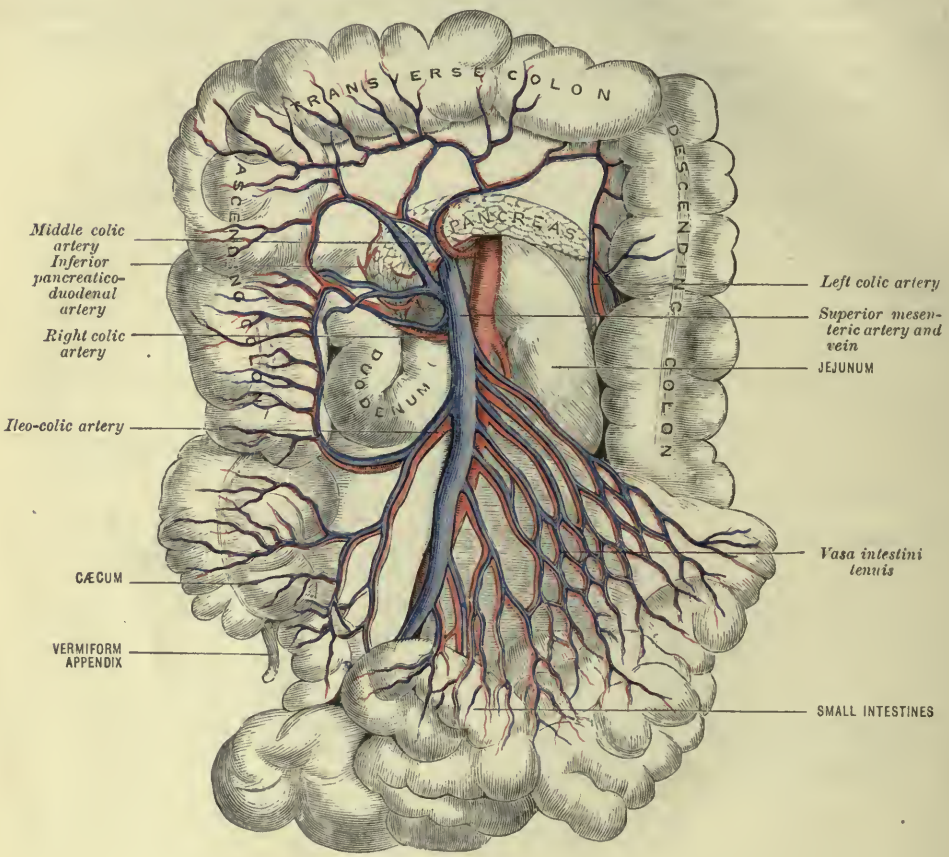
Fossa subcæcalis or ileo-cæcal.

Fossa intersigmoidea.

Expose by cutting through the anterior layer of mesentery the following blood-vessels:—

Superior mesentery artery and branches.

FIG. 173.—THE SUPERIOR MESENTERIC ARTERY AND VEIN.—(*Morris.*)
(The colon is turned up, and the small intestines are drawn over to the left side.)



Superior mesenteric vein and tributaries.

Note the mesenteric glands. (See Fig. 177.)

Inferior mesenteric artery and branches.

Inferior mesenteric vein and tributaries. (See Fig. 174.)

Portal vein and tributaries. (See Figs. 173, 174, and 175.)

FIG. 174.—THE INFERIOR MESENTERIC ARTERY AND VEIN.—(*Morris.*)

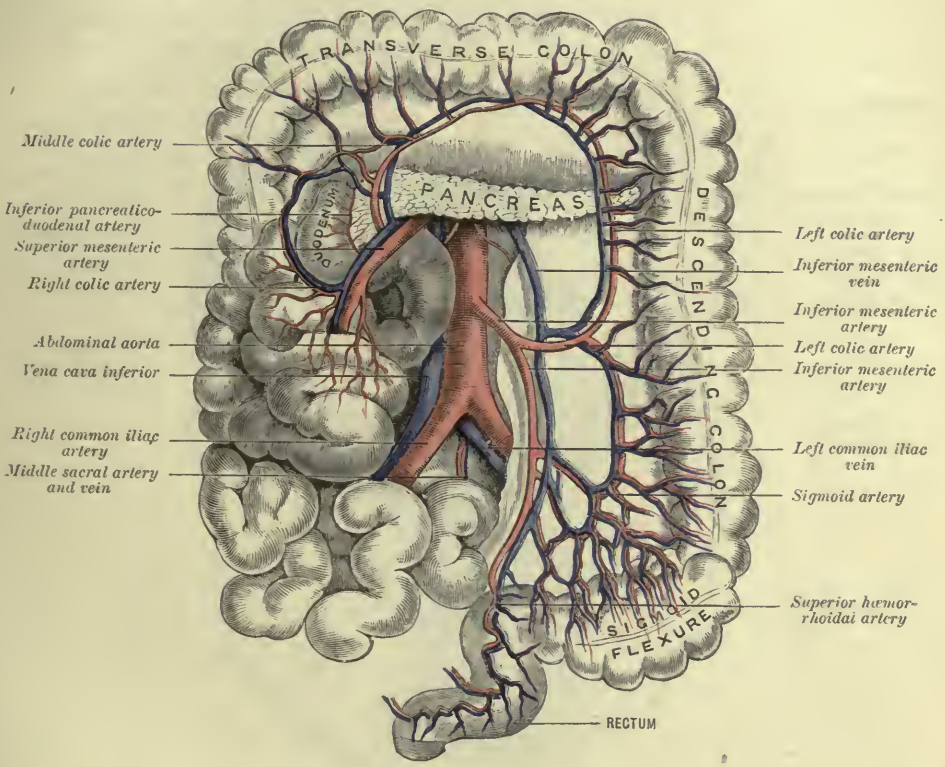
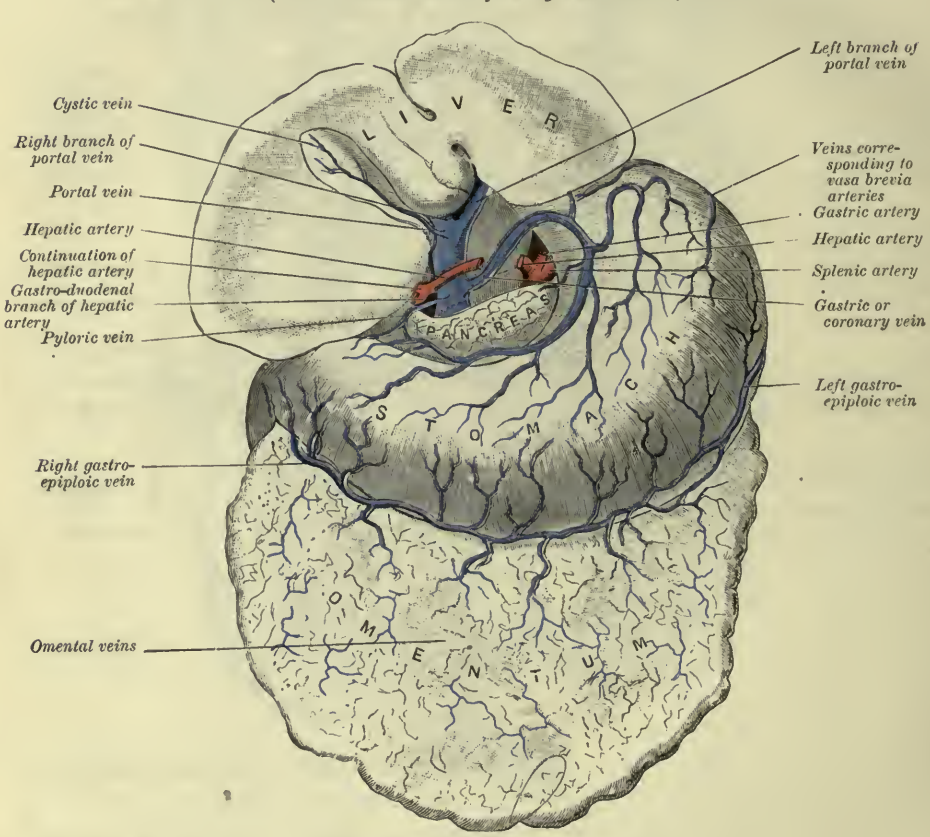


FIG. 175.—THE VEINS OF THE STOMACH AND THE PORTAL VEIN.—(*Morris.*)
(From a dissection by W. J. Walsham.)



DEMONSTRATION IV.

REMOVAL OF ABDOMINAL VISCERA.

SMALL INTESTINES:—

Place two ligatures around the jejunum at its beginning and cut between the ligatures. Similarly divide the ileum six inches above its termination. Divide the mesentery close to the intestines. Cut off about ten inches of the upper part of the jejunum and the same length of the lower part of the ileum, wash them, distend with air, and dry them. After they are dry cut them open and study them.

What is the length of jejunum; length of ileum?

What is **Meckel's diverticulum?**

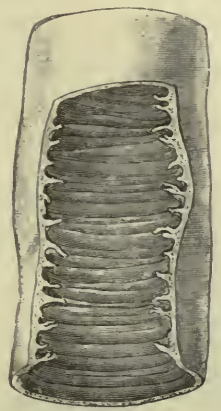
Mesentery—attachments and extent.

Structure of intestinal wall.

Four coats—describe each.

In mucous coat—valvulæ conniventes, villi, solitary glands, and Peyer's patches.

FIG. 176.—PORTION OF THE SMALL INTESTINE, LAID OPEN TO SHOW THE VALVULÆ CONNIVENTES. (Brinton.) (*Morris.*)

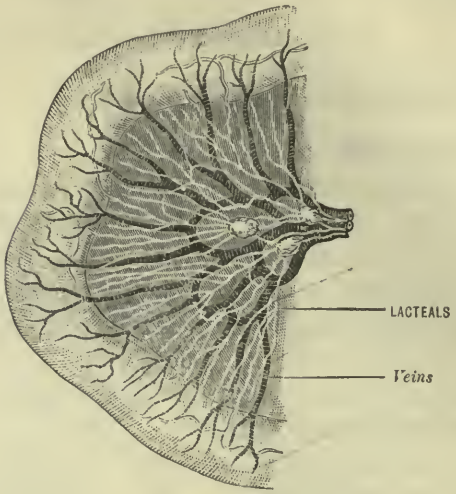


What is the blood-supply? (See Fig. 173.)

What is the nerve-supply?

Lymphatics of small intestines.

FIG 177.—VESSELS OF THE SMALL INTESTINE.—(*Morris.*)

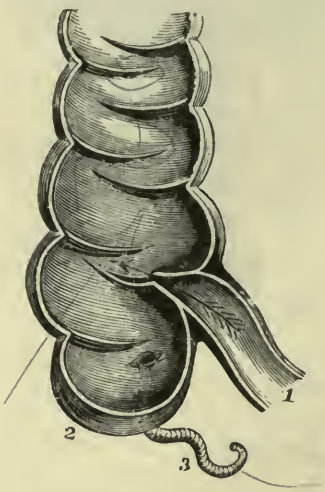


LARGE INTESTINES.

Note the position of the different parts of the large intestines.

Divide the ascending colon six inches above the entrance of the ileum. Remove, wash, distend with air and dry the cæcum. Then cut open and study **cæcum,**—walls, ilio-cæcal valve, **opening** of appendix, and **appendix.**

FIG. 178.—SECTION THROUGH THE JUNCTION OF THE LARGE AND SMALL INTESTINE TO SHOW THE ILEO-CÆCAL VALVE AND APPENDIX VERMIFORMIS.—(*Holden.*)
1. Ileum. 2. Cæcum or caput coli. 3. Appendix Vermiformis.



Types of cæcum (Fig. 179).

Remove the rest of the large intestines down to the rectum. Note hepatic, splenic, and sigmoid flexures.

Clean, distend with air, and dry part of the ascending colon and sigmoid flexure, then cut open and study their walls, blood-supply, and nerve-supply.

FIG. 179.—THE FOUR TYPES OF CÆCUM. (Treves.) (*Morris.*)

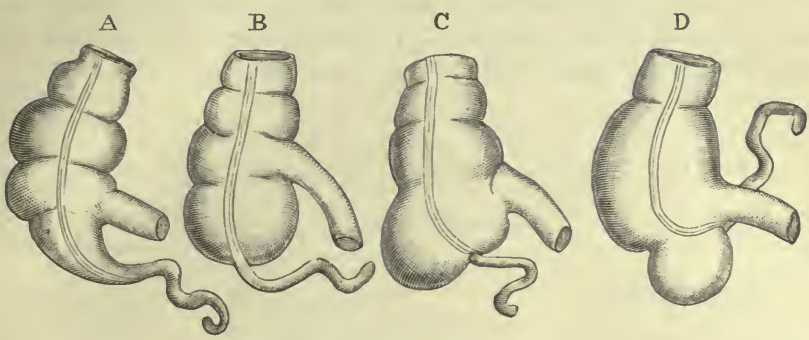
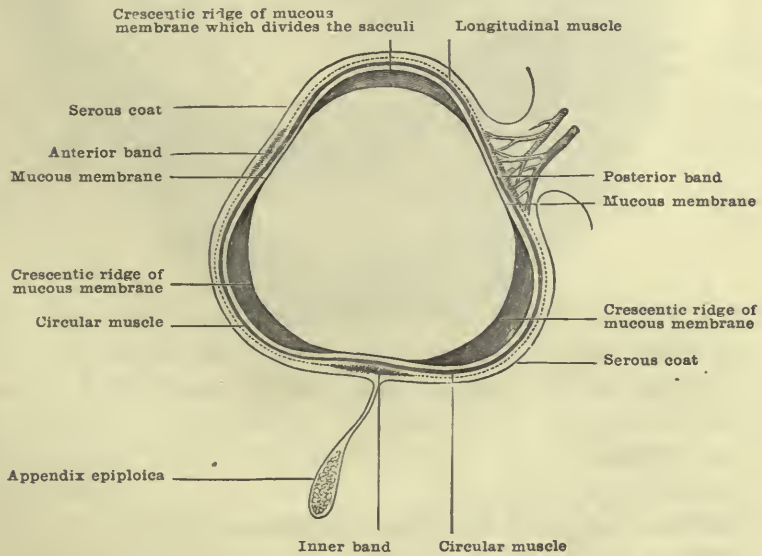


FIG. 180.—SECTION OF THE ASCENDING COLON. (Allen Thomson.) (*Morris.*)



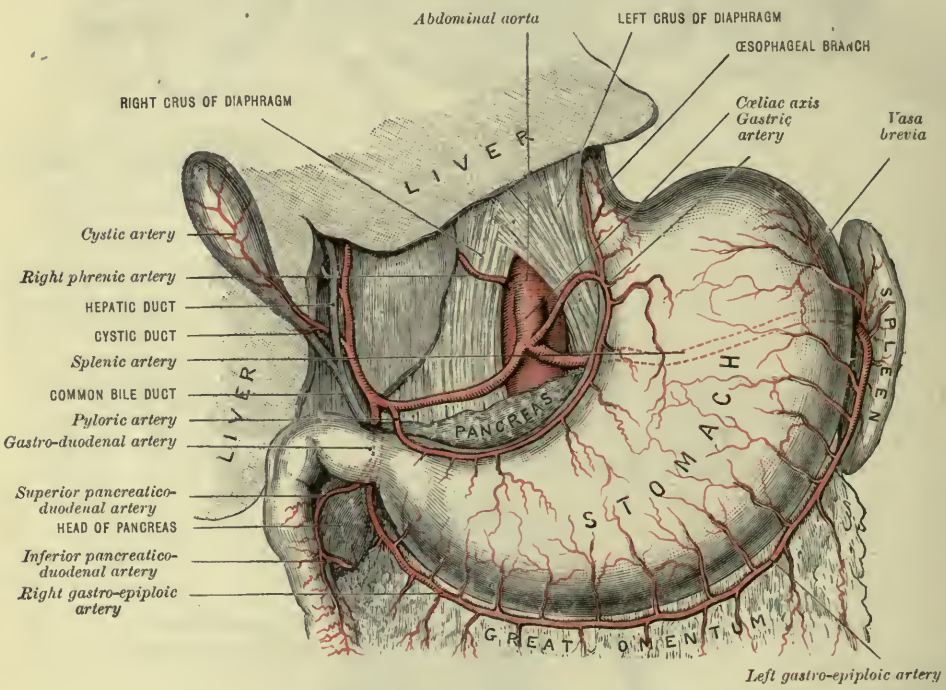
For blood-supply see Figs. 173 and 174.

A close network of tissue surrounds the branches of the abdominal aorta. This tissue consists almost entirely of nerve-plexuses of the sympathetic system. The solar plexus is the largest and surrounds the cœliac axis.

Study the **solar plexus** and the offsets of the solar plexus.

Expose and study the cœliac axis and its branches. *Note especially the branches going to the stomach.* To expose these pull down the stomach and cut through the peritoneum above the stomach.

FIG. 181.—THE CŒLIAC ARTERY AND ITS BRANCHES.—(*Morris.*)



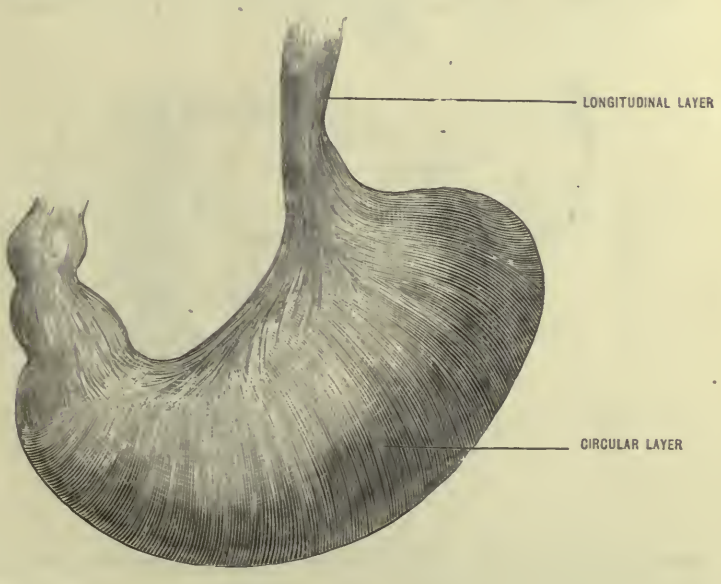
Pull the stomach down and cut the œsophagus just below the diaphragm, and ligate and divide the duodenum at its beginning. Cut the blood-vessels going to the stomach and remove the stomach; clean, distend with air, and dry it.

Study the **stomach:**—

General description.
Cardiac orifice; cardiac end, or fundus.
Borders and surfaces.
Relation to surrounding parts.
Relation to peritoneum.
Alterations in position.
Structures of its wall—four coats.

FIG. 182.—ANTERIOR SURFACE OF THE STOMACH.—(*Morris.*)

FIG. 183.—MUSCULAR COAT OF THE STOMACH. (Luschka.) (*Morris.*)



Blood-supply of stomach. (See Fig. 181.)

Nerve-supply—vagus and sympathetic.

Lymphatics.

Inflate the duodenum in place; note its form, parts, and its relation to pancreas, common bile-duct, pancreatic duct, kidney, superior mesenteric artery and vein (Figs. 184, 185, 186).

Observe the fossa duodeno-jejunalis. (See Fig. 172.)

Also study the **pancreas** in place and its relation to surrounding structures. See same figures as for duodenum.

FIG. 184.—THE DUODENUM FROM IN FRONT.—(*Morris.*)

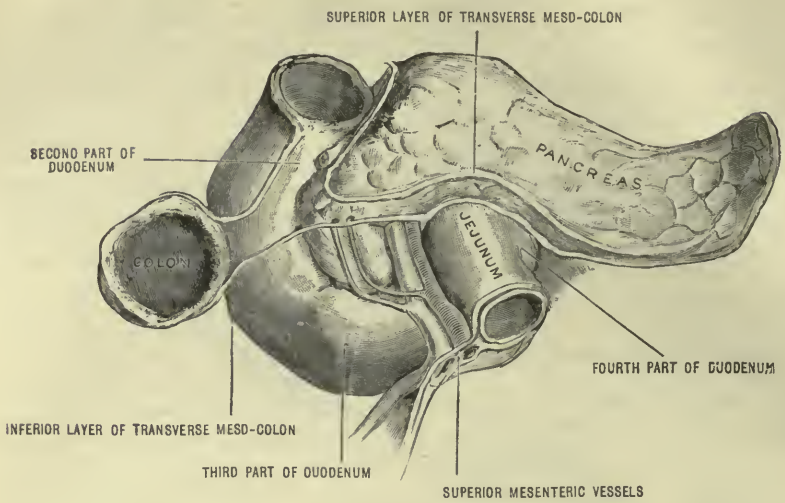
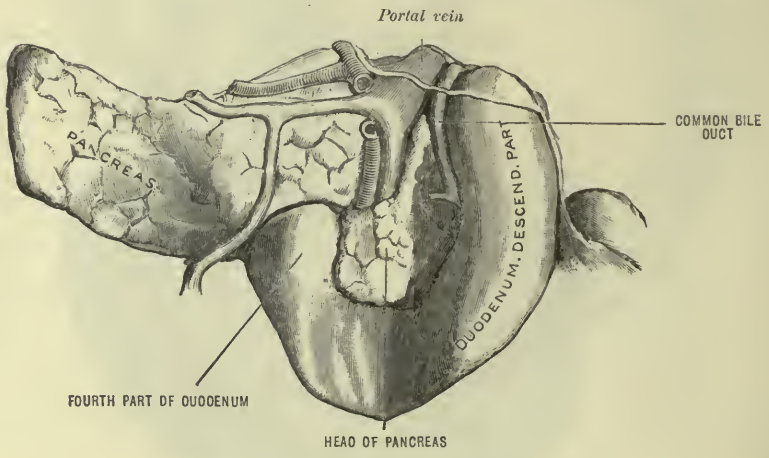


FIG. 185.—THE DUODENUM FROM BEHIND.—(*Morris.*) (Also see Fig. 182.)



Next raise the liver and expose the common bile-duct, the hepatic artery, and the portal vein by cutting through the lesser omentum. Notice their relative positions.

Trace the **common bile-duct** down to its entrance into duodenum and junction with the pancreatic duct. Also trace the common bile-duct up toward the liver to where it is formed by the hepatic ducts; trace the hepatic ducts and cystic duct. Also trace the hepatic artery and portal vein up to the liver. (See Figs. 186, 187, 188, and 189.)

FIG. 186.—DIAGRAM OF THE BRANCHES OF THE CŒLIAC AXIS.—(*Holden.*)
(Pancreas in dotted outline behind the stomach.)
1. Coronaria ventriculi. 2. Splenic a. 3. Hepatic a. 4. Pyloric a. 5. Gastro-duodenalis. 6. Gastro-epiploica sinistra. 7. Vasa brevia. 8. Superior mesenteric a.

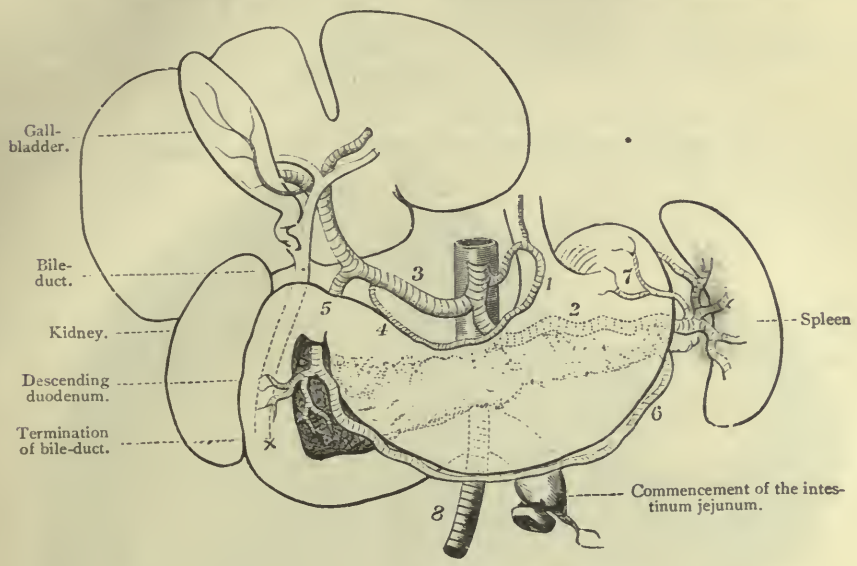


FIG. 187.—DIAGRAM OF THE VENA PORTÆ —(*Holden.*)
(The arrow is introduced behind the free border of the lesser omentum.)

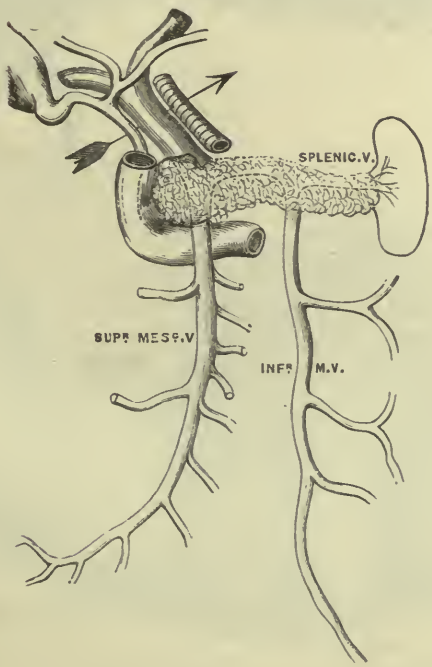
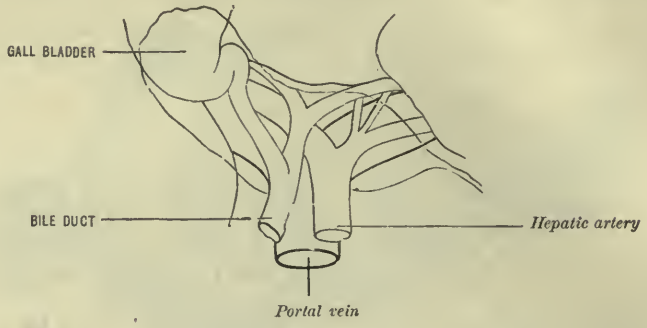


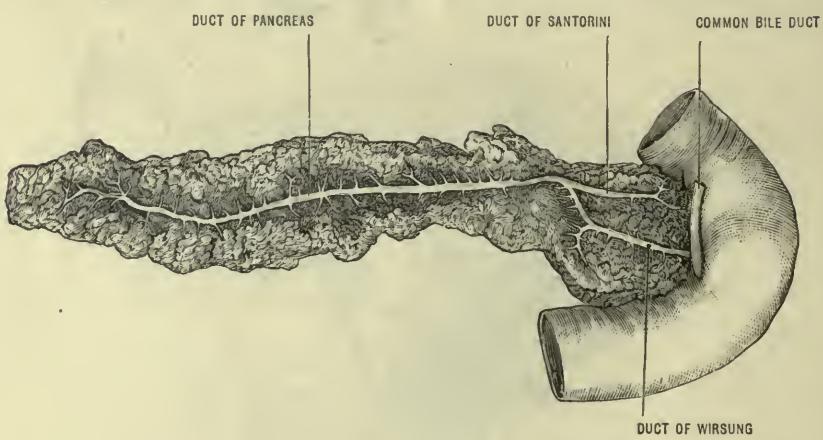
FIG. 188.—RELATION OF STRUCTURES AT AND BELOW THE TRANSVERSE FISSURE. (Thane.) (*Morris.*)



Expose the **pancreatic duct** or canal of Wirsung, and trace it to its junction with the common bile-duct or entrance into duodenum.

Also trace duct of Santorini.

FIG. 189.—THE PANCREAS AND ITS DUCT.—(*Morris.*)



Now remove the duodenum and pancreas.

Study the **duodenum,**—its structure, blood- and nerve-supply.

Study the **pancreas,**—head, neck, body, and tail, ducts, blood- and nerve-supply, and lymphatics.

SPLEEN:—

Note its position, shape, surfaces, borders, and supplementary spleens, or lienculi.

Trace splenic artery from cœliac axis to spleen.

Remove the spleen. Study its structure, size, and weight.

What is its nerve-supply?

Lymphatics of spleen.

DEMONSTRATION V.

LIVER:—

What is its position in relation to the ribs, stomach, kidney, and colon? Peritoneum and ligaments.

Remove the liver. Study its borders, surfaces, lobes, fissures and structures. Describe the **gall-bladder** or cyst.

FIG. 190.—SUPERIOR SURFACE OF THE LIVER.—(*Morris.*)

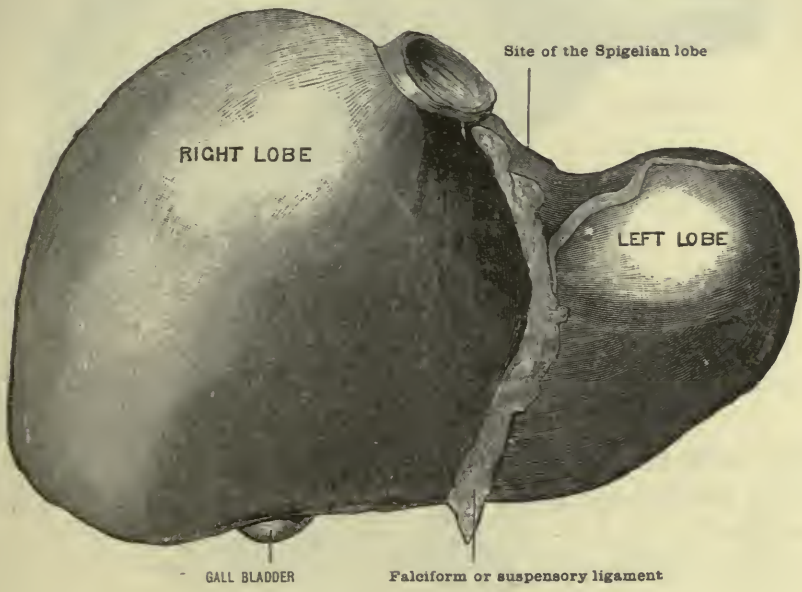
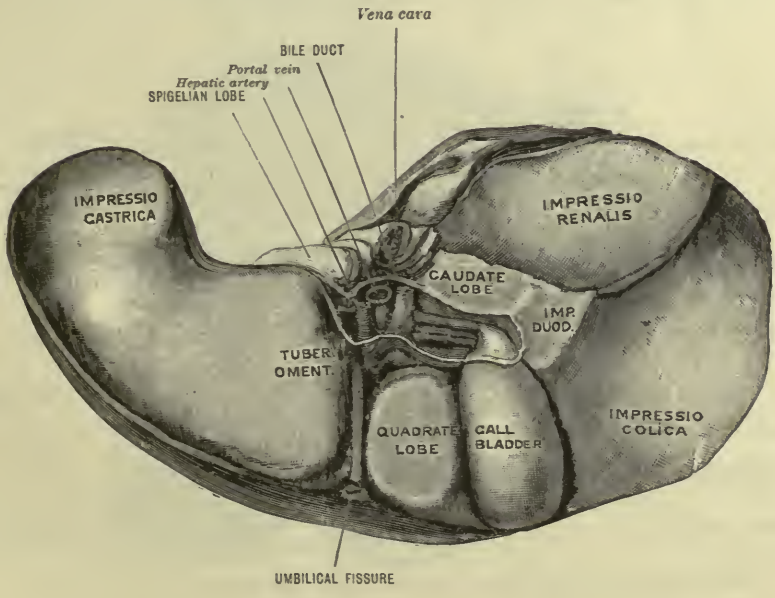
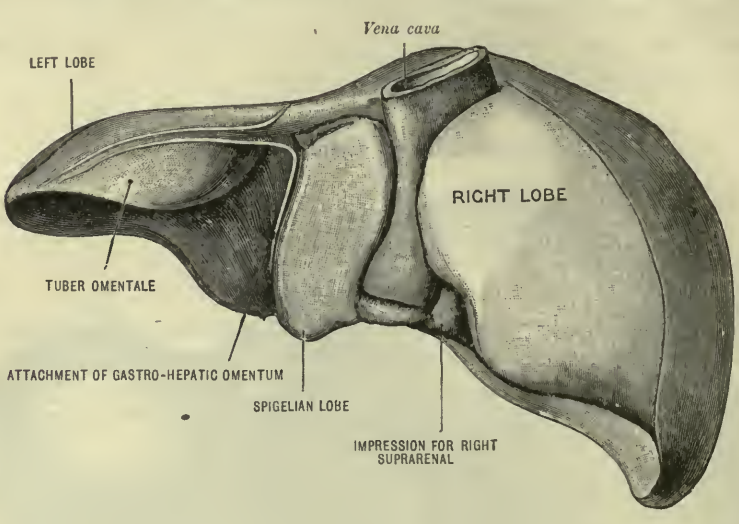


FIG. 191.—THE INFERIOR SURFACE OF THE LIVER.—(*Morris.*)



Trace the hepatic ducts, portal vein, hepatic artery into the liver. Note hepatic veins. How many sets of capillaries does the liver have?

FIG. 192.—POSTERIOR SURFACE OF THE LIVER.—(*Morris.*)



Review the hepatic artery; the portal vein and its tributaries.

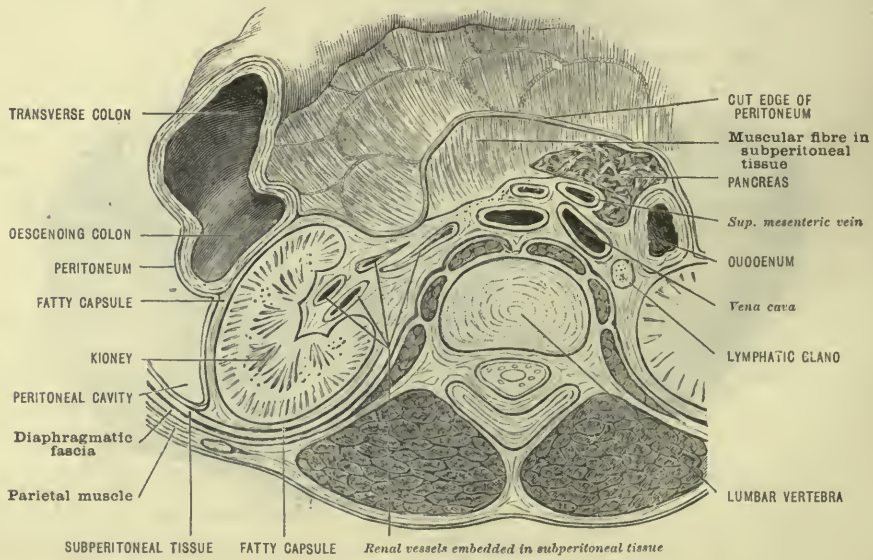
KIDNEY AND SUPRARENAL BODY.

Expose the kidneys and suprarenal bodies by removing the tissue in front of them.

Study their position and relations to surrounding parts.

Study the investment or capsule of kidney.

FIG. 193.—DIAGRAM SHOWING RELATION OF KIDNEY TO CAPSULE. (W. A.) (*Morris.*)



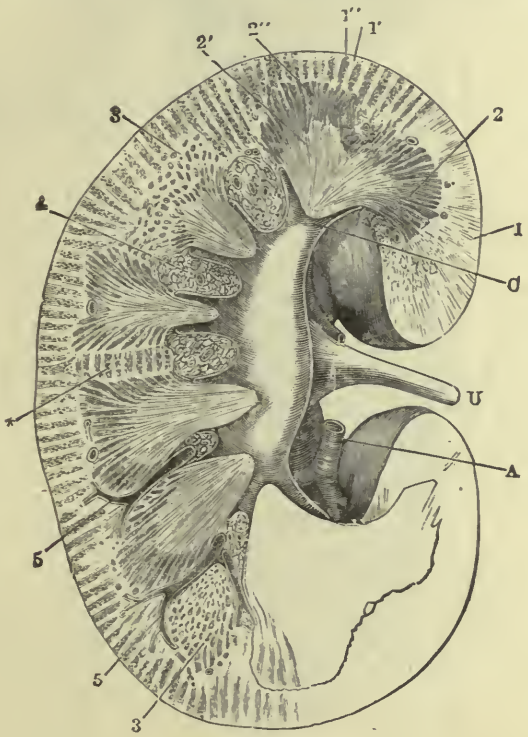
Note the relative position of the renal artery, renal vein, and ureter.

Remove one kidney with its ureter, cutting the ureter at the brim of pelvis. *Do not remove the other kidney at this dissection.*

General description of the kidney, shape, size, hilum, and sinus.

Cut the kidney lengthwise, as seen in the figure below. Study the parts exposed by the cut.

FIG. 194.—LONGITUDINAL SECTION OF THE KIDNEY (*Tyson, after Henle*).—(*Holden.*)
1. Cortex. 1″. Labyrinth. 1′. Medullary Rays. 2. Medulla. 2″. Boundary layer of medulla. 2′. Papillary portion of medulla. 3. Transverse section of tubules in boundary layer. 4. Fat of renal sinus. *. Transversely coursing medullary rays. 5. Artery. C. Renal calyx. U. Ureter. A. Branch of renal artery.



What is the blood- and nerve-supply of the kidney.

Describe the suprarenal bodies.

The figures below show the relations of some of the abdominal and thoracic viscera.

FIG. 195.—RELATION OF THE ABDOMINAL VISCERA TO THE PARIETES. (Treves.) (*Morris.*)

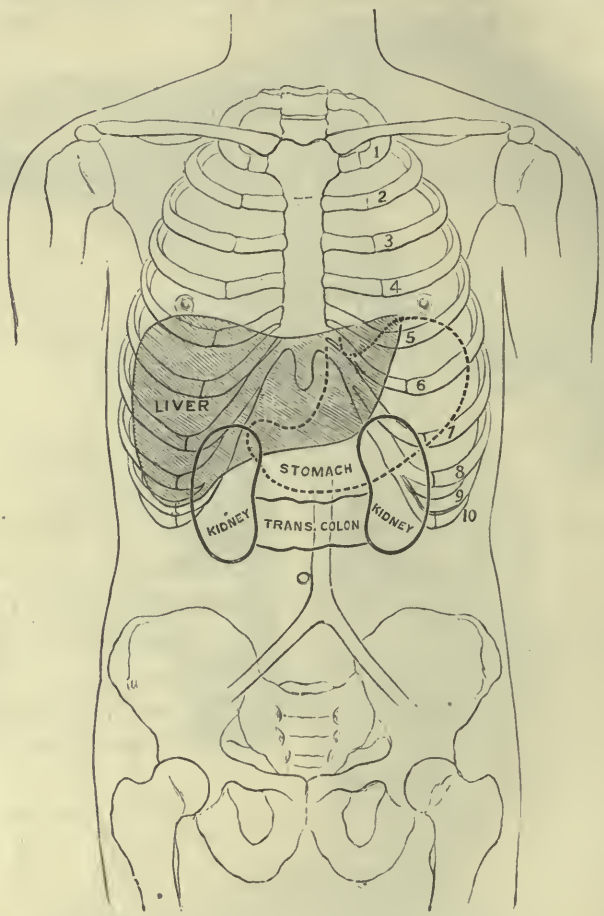
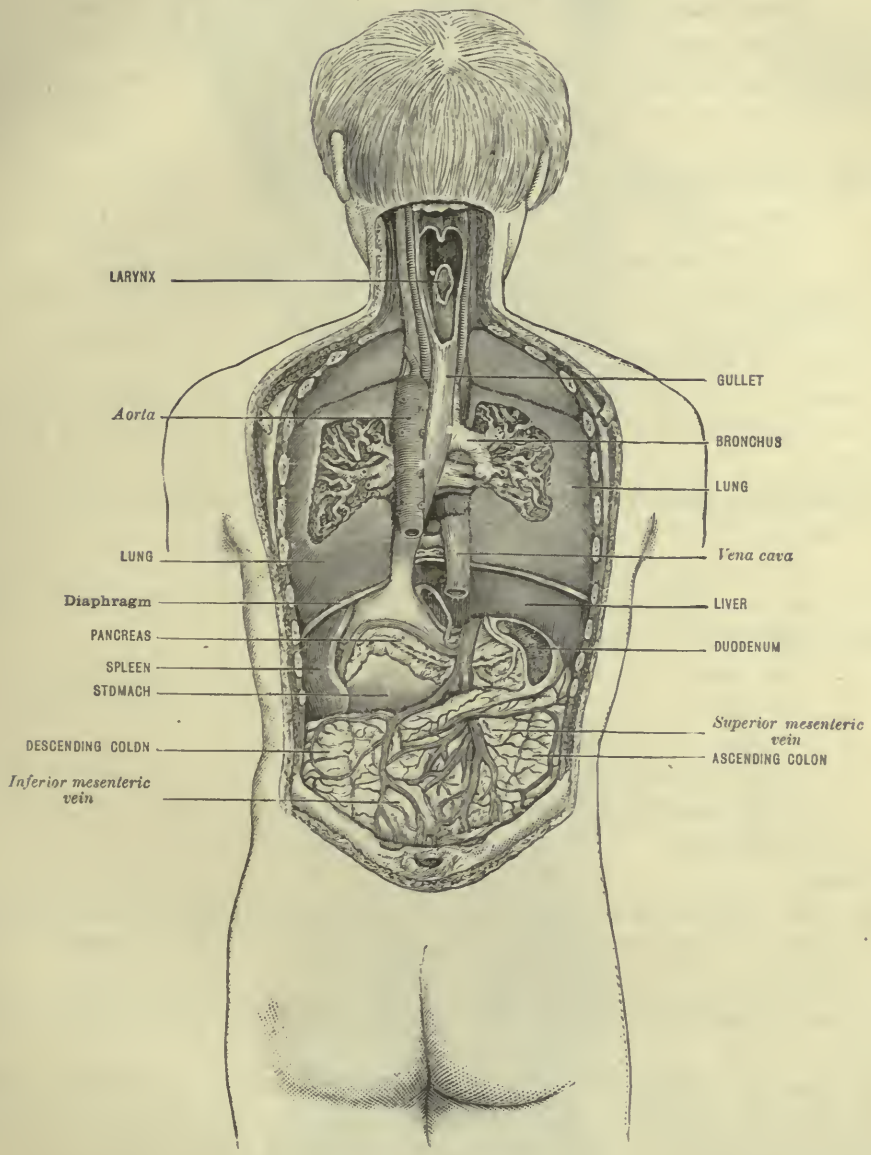


FIG 196.—ABDOMINAL VISCERA, FROM BEHIND. (Rüdinger.) (*Morris.*)



DEMONSTRATION VI.

STRUCTURES ON THE POSTERIOR WALL OF ABDOMEN.

Sympathetic nerves.

You will find a close network of tissue in front of the abdominal aorta and around its branches. This tissue is nearly entirely sympathetic nerve tissue. It is arranged in plexuses, each plexus taking the name of the artery around which it is placed. The plexus around the cœliac axis is the largest and is called the **solar plexus.**

The other plexuses are offsets of the solar plexus.

SOLAR PLEXUS:—

Position.

Semilunar ganglion.

Expose the ganglia. Note their position, shape and the connection of the great splanchnic and small splanchnic nerves.

Study the **splanchnic** nerves.

Offsets of the solar plexus.

These take the names of the arteries with which they pass out to the viscera.

Expose the **gangliated cord** in the abdomen. (See Fig. 197.)

Arteries:—

Abdominal arteries.

Expose the abdominal aorta, notice the position of its branches, study those with which you are not already familiar.

Branches:—

Phrenic.	Renal.
Cœliac.	Suprarenal.
Sup. mesenteric.	Spermatic.
Inf. mesenteric.	Ovarian.
Lumbar.	Middle sacral.

Veins:—

Inferior vena cava and tributaries. Note the relation of the veins to the arteries. What difference between right and left spermatic vein? (See Fig. 198.)

Note the beginning of the **azygos veins** by the ascending lumbar (Fig. 199).

Expose the **receptaculum chyli,**—the beginning of the thoracic duct. It lies behind the aorta, and between the aorta and right crus of the diaphragm in front of the second lumbar vertebra (Fig. 199).

Study the iliac fascia. *Do not remove it at this time in the dissection.*

Observe and study the muscles:—

Psoas.

Psoasparvus.

Iliacus.

Quadratus lumborum.

FIG. 197.—LUMBAR PORTION OF THE GANGLIATED CORD, WITH THE SOLAR AND HYPOGASTRIC PLEXUSES. (Henle.) (*Morris.*)

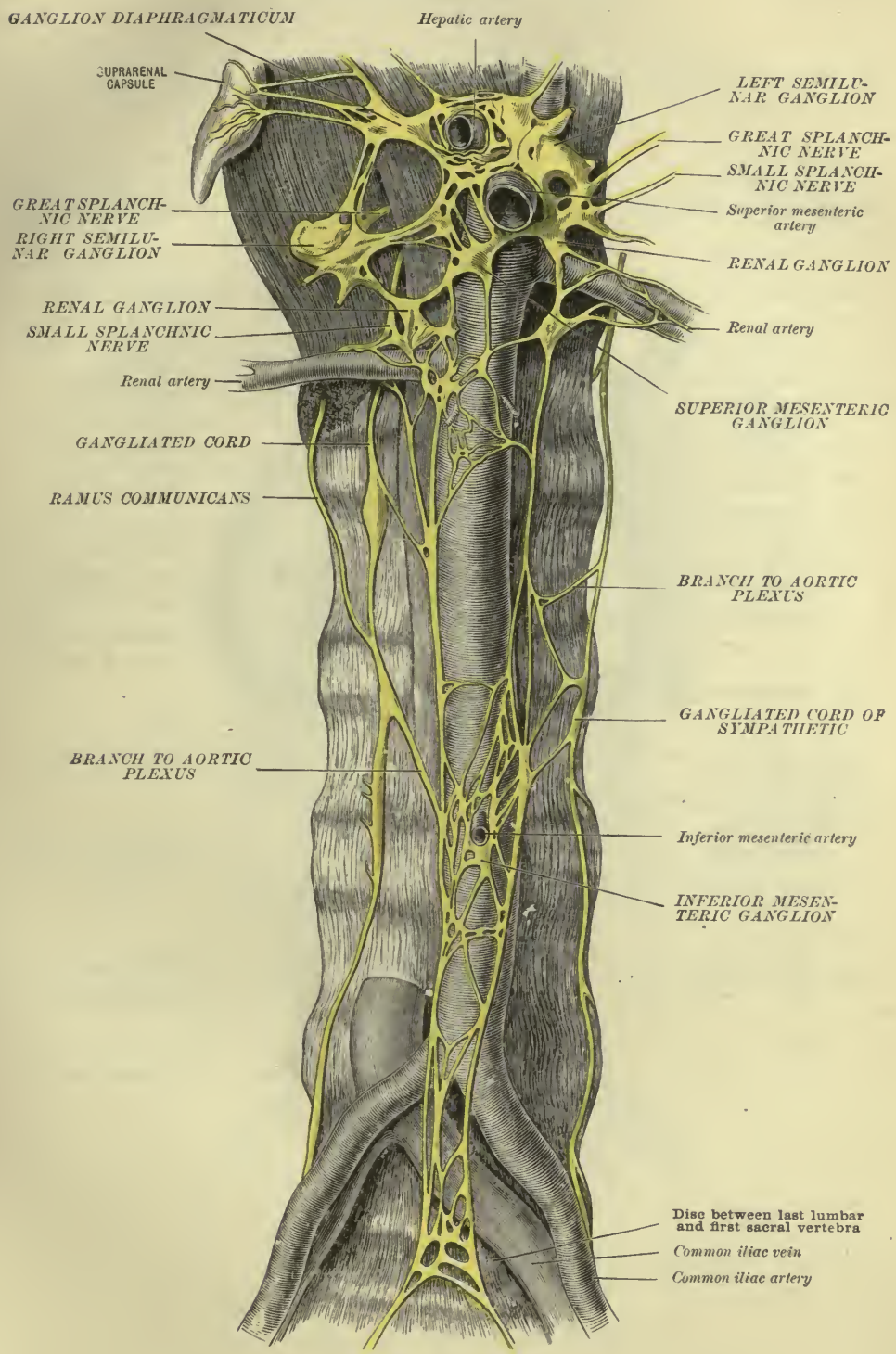


FIG. 198.—THE ABDOMINAL AORTA AND ITS BRANCHES, WITH THE INFERIOR VENA CAVA AND ITS TRIBUTARIES.—(*Morris.*)

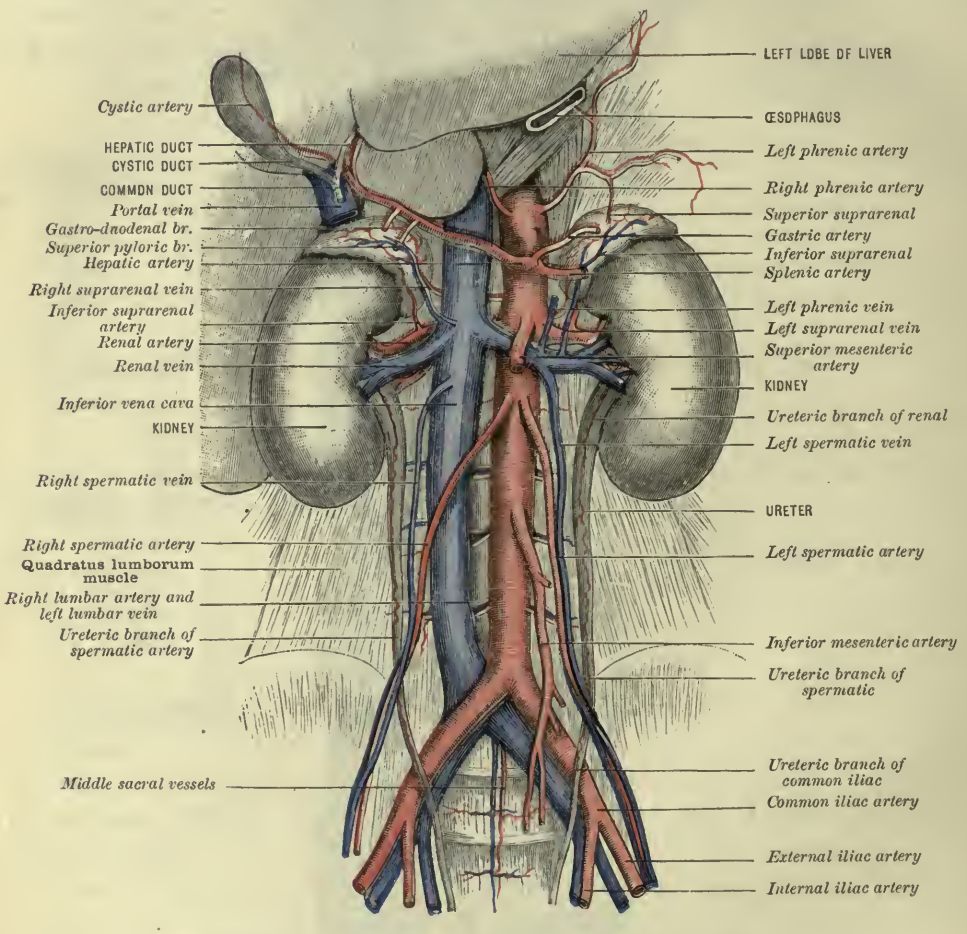


FIG. 199.—THE SUPERIOR AND INFERIOR VENÆ CAVÆ, THE INNOMINATE VEINS, AND THE AZYGOS VEINS.

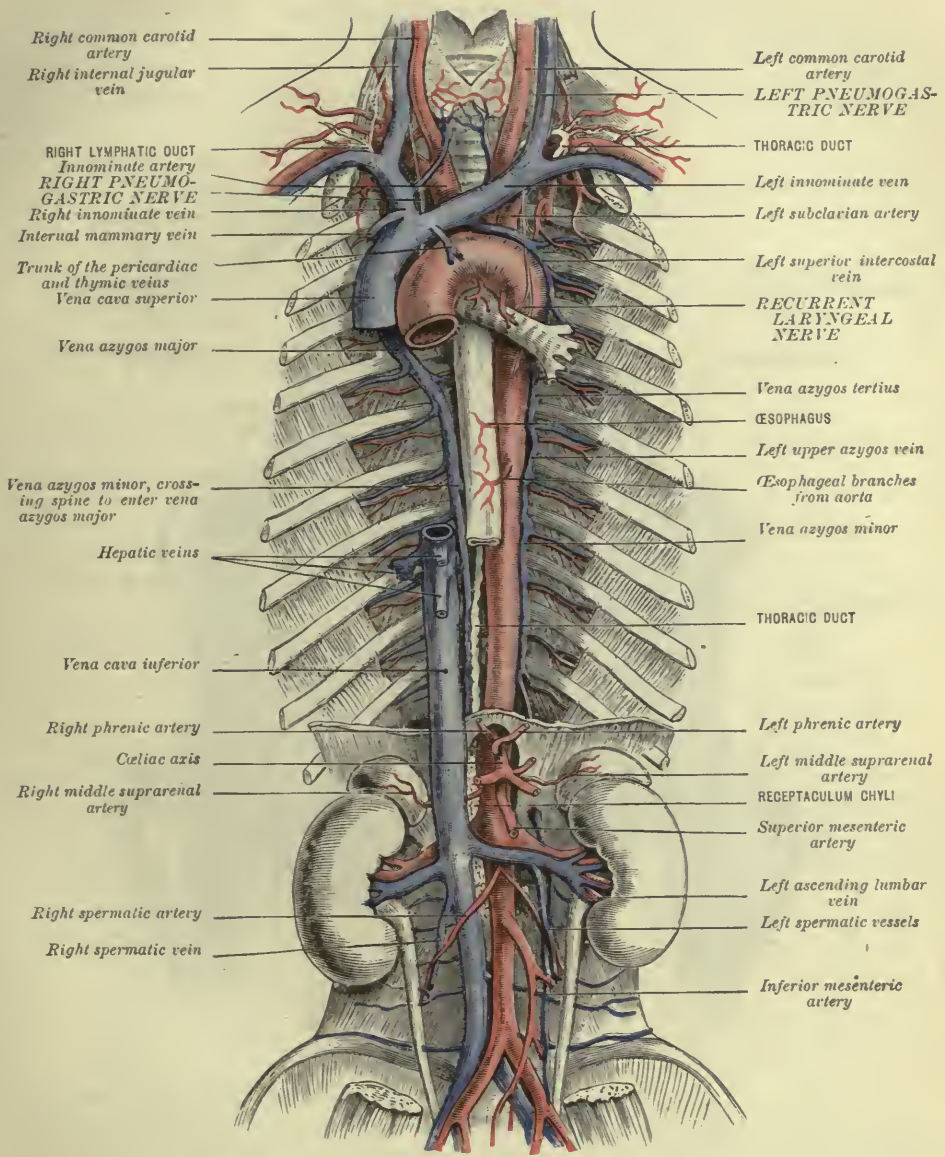
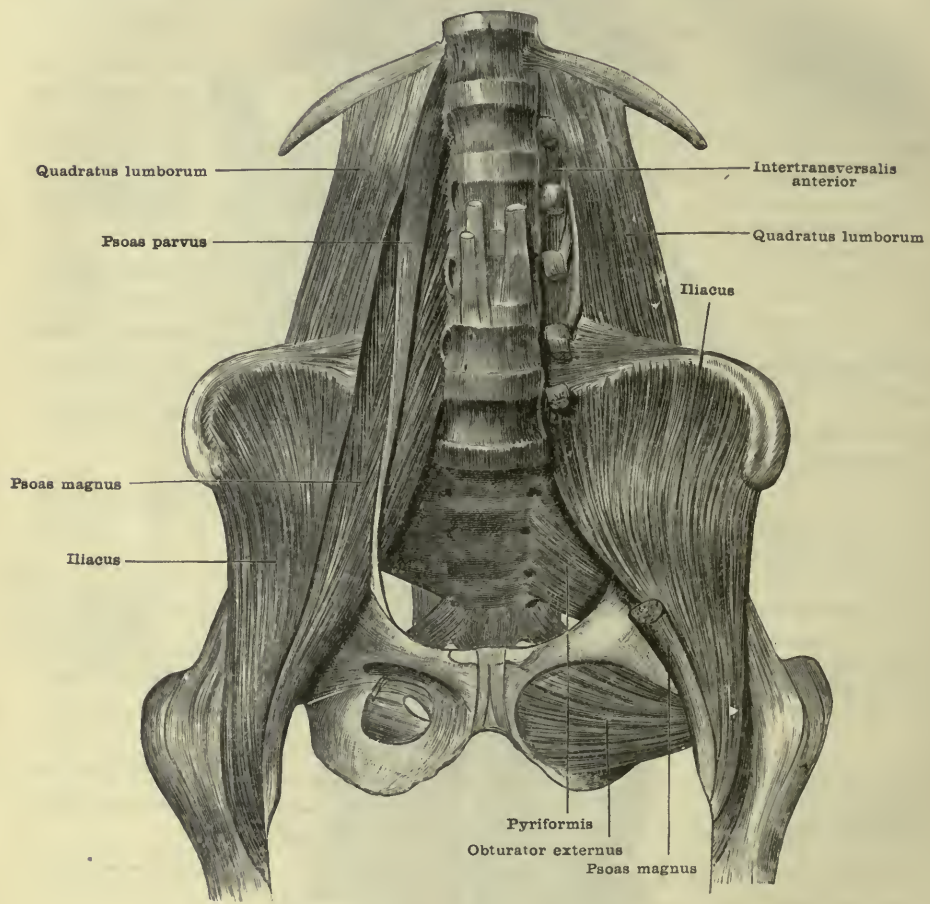


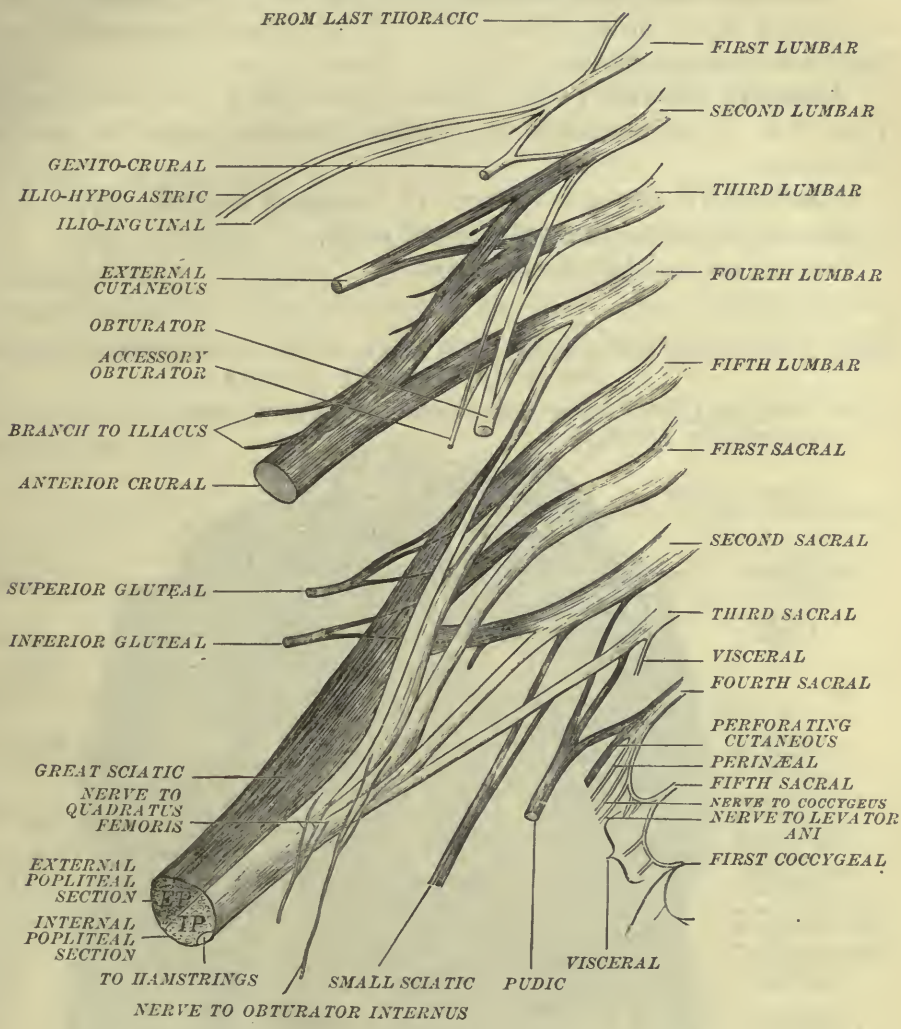
FIG. 200.—PSOAS, ILIACUS, AND QUADRATUS LUMBORUM.—(*Morris.*)



LUMBAR PLEXUS:—

A plan of the formation of the lumbar plexus is given in the figure below.

FIG. 201.—DIAGRAM OF THE LUMBAR AND SACRAL PLEXUSES. (Modified from Paterson.) (*Morris.*)



Expose the lumbar plexus:—

Genito-crural (*N. genito-femoralis*) lies on the anterior surface of the psoas muscle. Trace it back through the psoas muscle to its origin and down to its division.

Ilio-hypogastric and **inguinal** pass in front of the quadratus lumborum muscle; pick them up here and trace them back through the psoas muscle to their origin.

External cutaneous (*N. cutaneus femoris lateralis*) passes in front

of the iliac muscle and behind iliac fascia. Trace it back through the psoas muscle to its origin and out to where it passes below Poupart's ligament just below the anterior superior spine of the ilium.

Anterior crural (*N. femoralis*) emerges from the outer border of the psoas above Poupart's ligament. Trace it through the psoas to its origin and down to where it passes below Poupart's ligament.

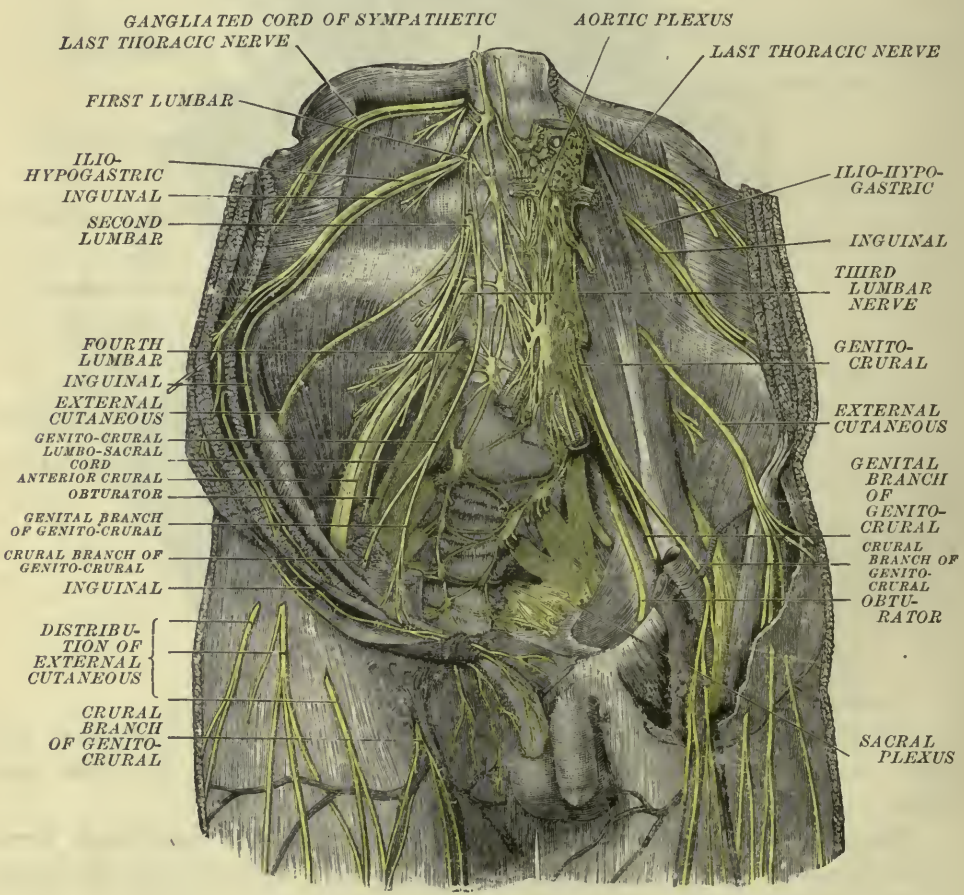
Obturator emerges from the inner border of the psoas at the posterior part of the brim of the pelvis. Trace it back to its origin and out to the obturator foramen.

Accessory obturator, when present, lies close to the obturator nerve. Trace it to its origin and down to where it passes anterior to the brim of the pelvis.

Lumbo-sacral cord lies in front of the ala of sacrum. Trace it to its origin and to its junction with sacral plexus.

Also expose the **last dorsal nerve.**

FIG. 202.—BRANCHES OF THE LUMBAR AND SACRAL PLEXUS VIEWED FROM BEFORE. (After Hirschfeld and Leveillé.) (*Morris.*)



DEMONSTRATION VII.

PELVIC REGION.

What is the difference between the male and female pelvis?

Study the positions and relations of the pelvic organs to each other and to the surrounding landmarks. Remove none of the viscera.

Note in the **male** pelvis:—

Bladder:—Position, form, relation, ligaments, and the part covered by peritoneum.

Rectum.—Position and the part covered by peritoneum.

In **female** pelvis.

Note the **bladder** and **rectum.**

Also **uterus.**—Position, ligaments, and part covered by peritoneum.

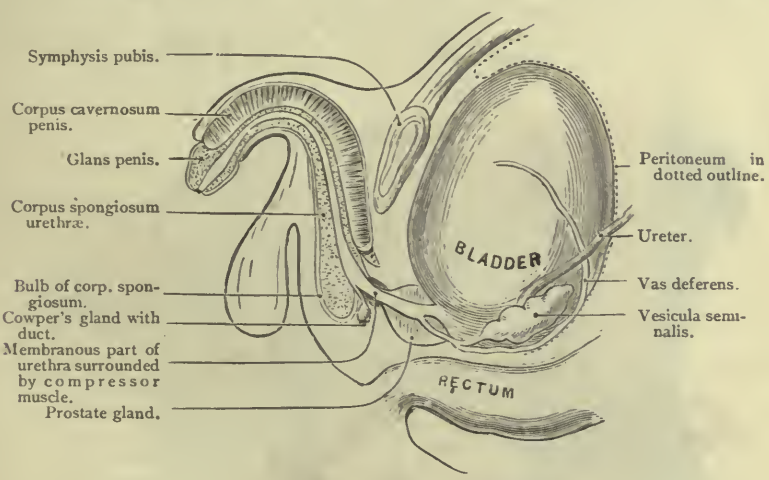
Fallopian Tubes.—Position, relation to broad ligaments.

Ovaries.—Position, relation to broad ligaments, and Fallopian tubes.

Round Ligaments.—Position, relation to broad ligaments, and attachments.

Trace the peritoneum in its course in the pelvis and over the pelvic viscera.

FIG. 203.—DIAGRAM OF THE RELATIVE POSITION OF THE PELVIC VISCERA.—(*Holden.*)



Expose the following arteries and veins:—

Arteries. (See Fig. 164):—

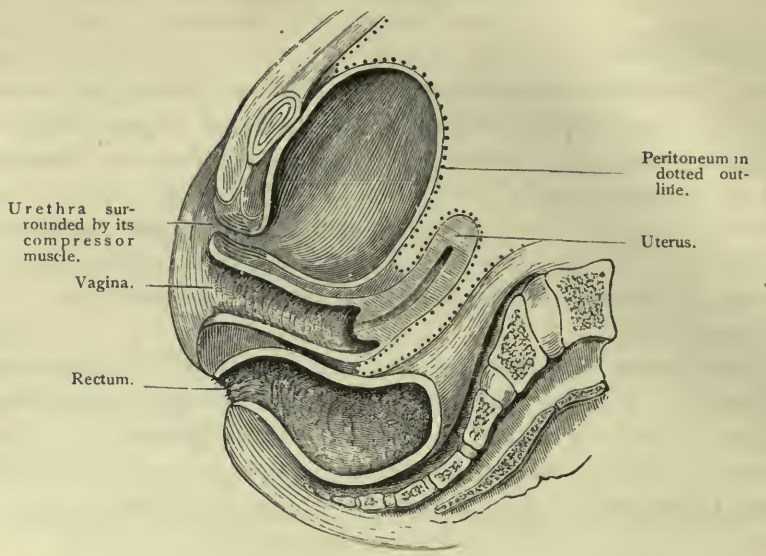
Common iliac.

External iliac.

Internal iliac (*A. hypogastrica*).

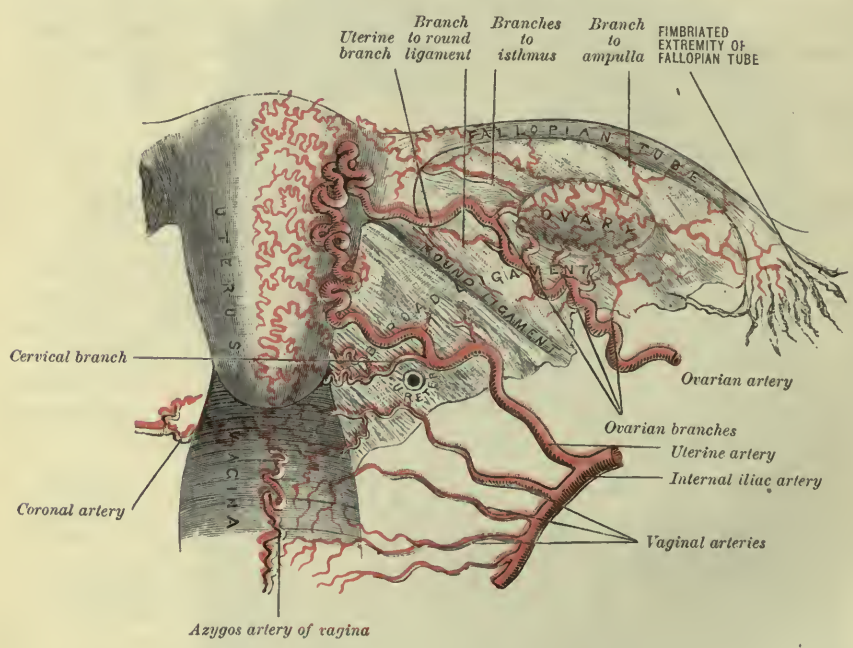
Hypogastric.	Uterine.
Superior, middle and inferior vesical.	Ovarian.
Middle hemorrhoidals.	Vaginal.

FIG. 204.—DIAGRAMMATIC VERTICAL SECTION THROUGH THE FEMALE PELVIC VISCERA.—(*Holden.*)



Veins accompanying the arteries.

FIG. 205.—SCHEME OF THE OVARIAN AND UTERINE AND VAGINAL ARTERIES.—(*Morris.*)



Review the lymphatics of the pelvis and abdomen.

Sympathetic nerves.

Hypogastric plexus.

Pelvic plexus.

DEMONSTRATION VIII.

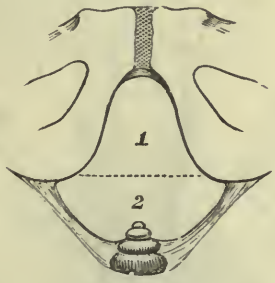
PERINEUM.

Read a general description of the perineum.

Examine the osseous and ligamentous boundaries of the lower aperture of the pelvis.

Draw a line from one tuberosity of the ischium to the other. This divides the aperture into an anterior or urethral region, and a posterior, ischio-rectal, or anal region.

FIG. 206.—DIAGRAM OF THE FRAMEWORK OF THE PERINEUM.—(*Holden.*)



Place the subject on his back in the perineal frame; draw the frame, with the cadaver, to the end of the table.

FIG. 207.—PERINEAL FRAME.

MALE PERINEUM.

Pass a urethral sound along the urethra into the bladder. Feel the prostate gland by inserting the finger into the rectum.

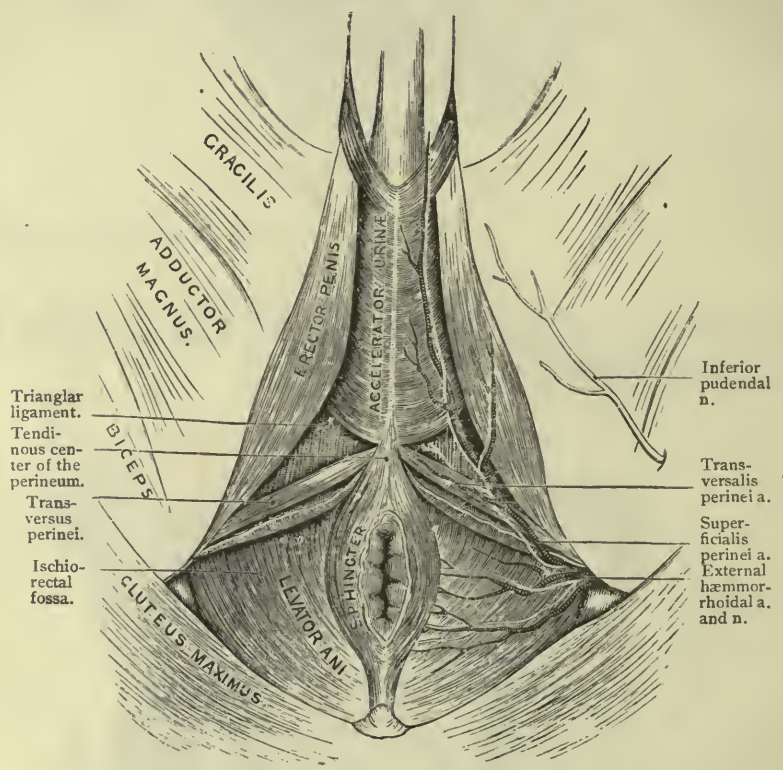
Moderately distend the rectum with tow, and sew the edges of the anus together; raise the scrotum by means of hooks.

Dissection of the **anal region.**

Make an incision through the skin along the line drawn from one tuberosity of the ischium to the other, crossing in front of the anus; a second incision parallel to the first across the tip of the coccyx; a third from the middle of the first incision back, encircling the anus, to the tip of the coccyx.

Notice the wrinkles of the skin around the anus caused by the **corrugator cutis ani muscle.**

FIG. 208.—MUSCLES, WITH SUPERFICIAL VESSELS AND NERVES, OF THE PERINEUM.—(*Holden.*)



Dissect the skin carefully away from the anus so as not to destroy the **external sphincter ani** and turn it outward onto the thigh. Notice the superficial fascia. This fascia is common to both anal and urethral regions of the perineum and is continuous with similar structures in adjacent regions.

Clean and study the **external sphincter muscle.** (See Fig. 208.)

On each side of the anus you see the base of the ischio-rectal fossa filled with fat.

The inferior hemorrhoidal arteries and nerves pass through this fat to

the rectum. Remove the fat with care so as to preserve as many as possible of these hemorrhoidal arteries and nerves.

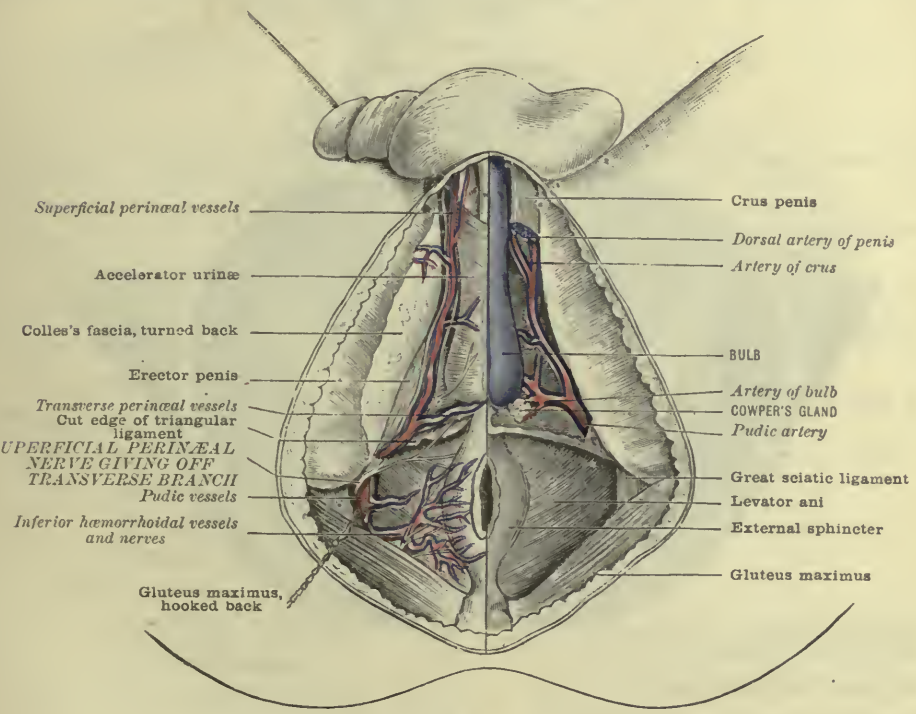
At the posterior boundary of this fossa is the gluteus maximus muscle; at the anterior boundary is the superficial transversus perinei muscle, at the inner side the levator ani muscle, outer side the internal obturator muscle. Expose these muscles, but do not destroy any part of them.

Trace on the bony pelvis the **internal pudic artery** and **pudic nerve.**

Now study the inferior hemorrhoidal arteries and hemorrhoidal, superficial perineal, and fourth sacral nerves, and hemorrhoidal veins,—plexus of veins. Also note the long pudendal nerve (Fig. 210).

FIG. 209.—THE ARTERIES OF THE PERINÆUM.—(*Morris.*)

On the right side of the perinæum (left side of this figure) Colles's fascia has been turned back to show the superficial vessels. On the left side the superficial vessels have been cut away with the anterior layer of the triangular ligament to show the deep vessels.



Dissection of the **urethral region.**

Dissection.—Make an incision from the scrotum along the raphe to the anal region. Reflect the skin outward onto the thigh. Just beneath the skin is the superficial fascia common to both urethral and anal regions and is continuous with similar structures in adjacent regions.

Beneath this superficial fascia, in the urethral region only, is a layer of fascia known as the superficial perineal fascia, Colles's fascia, or deep layer of the superficial perineal fascia. To avoid confusion we will call it Colles's fascia.

Colles's fascia may be demonstrated by blowing air beneath it with a blow-pipe. It is attached on each side to the rami of the os pubis and ischium; anteriorly it is continuous with the tunic dartos of the scrotum, posteriorly at the base of the urethral triangle it passes around the transversus perinei muscles and becomes continuous with the deep perineal fascia or triangular ligament.

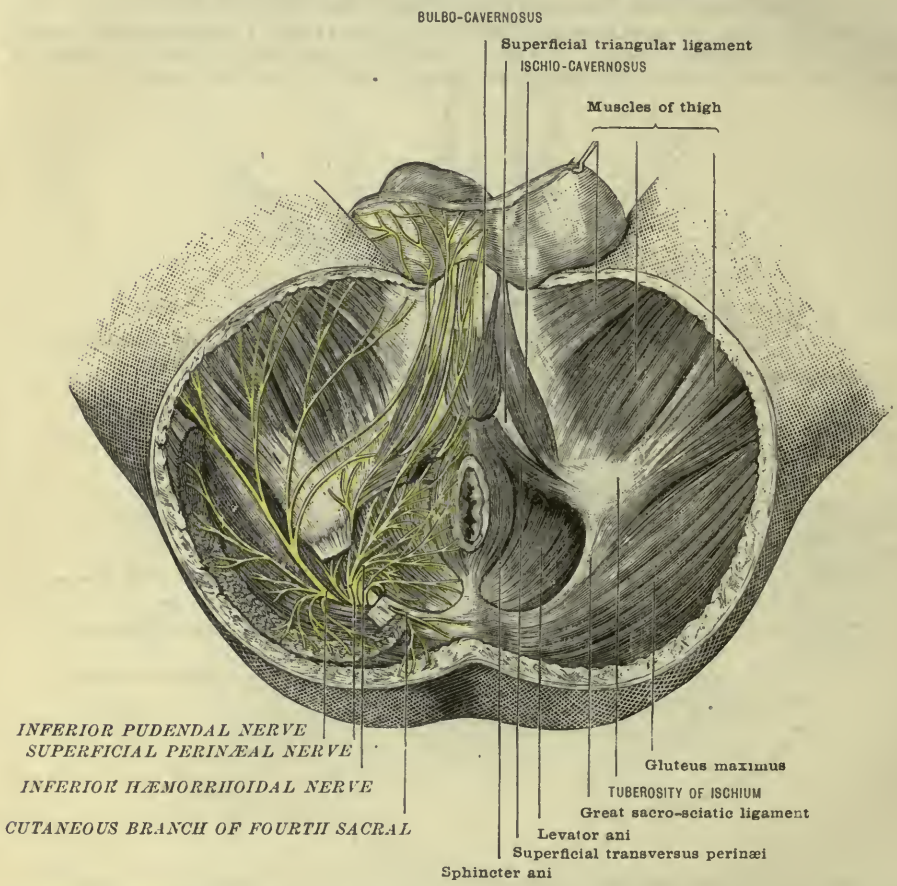
Remove Colles's fascia and expose the structures below:—

Nerves (see Figs. 209, 210):—

Superficial perineal.

Inferior pudendal.

FIG. 210.—THE MALE PERINÆUM. (Modified from Hirschfeld and Leveillé.) (*Morris.*)



Arteries (see Fig. 209):—

Superficial perineal.

Transverse perineal.

Muscles (see Fig. 208):—

Bulbo-cavernosus.

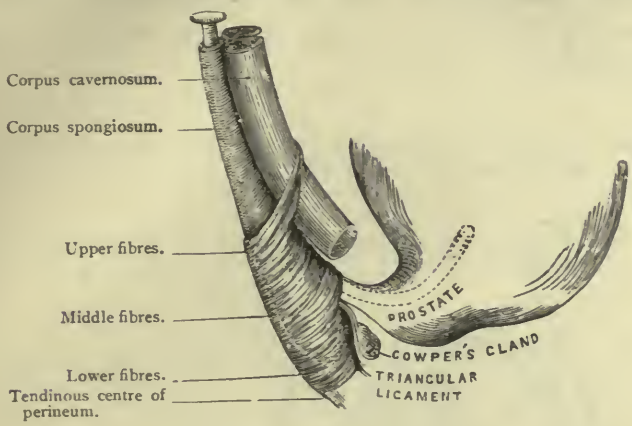
Ischio-cavernosus.

Transversus perinæi.

What is the tendinous point?

Notice the arrangement of the fibres of bulbo-cavernosus muscle in the figure below:—

FIG. 211.—DIAGRAM TO SHOW THE ACCELERATOR URINÆ IN PROFILE.—(*Holden.*)



Cut through the median line of the bulbo-cavernosus muscle and turn the fibres outward to expose the bulb of the urethra.

Remove part of the ischio-cavernosus muscle and observe the crus of the penis.

The **triangular ligament** or deep perineal fascia can be seen in the space between the transversus perinæi, ischio-cavernosus, and bulbo-cavernosus muscles. (See Figs. 209 and 210.)

Between the fascia of Colles and the triangular ligament are the following structures:—

Muscles:—

Bulbo-cavernosus.
Ischio-cavernosus.
Transversus perinæi.

Nerves:—

Superficial perinæi.
Long pudendal.

Arteries:—

Superficial perinæi.
Transversus perinæi.

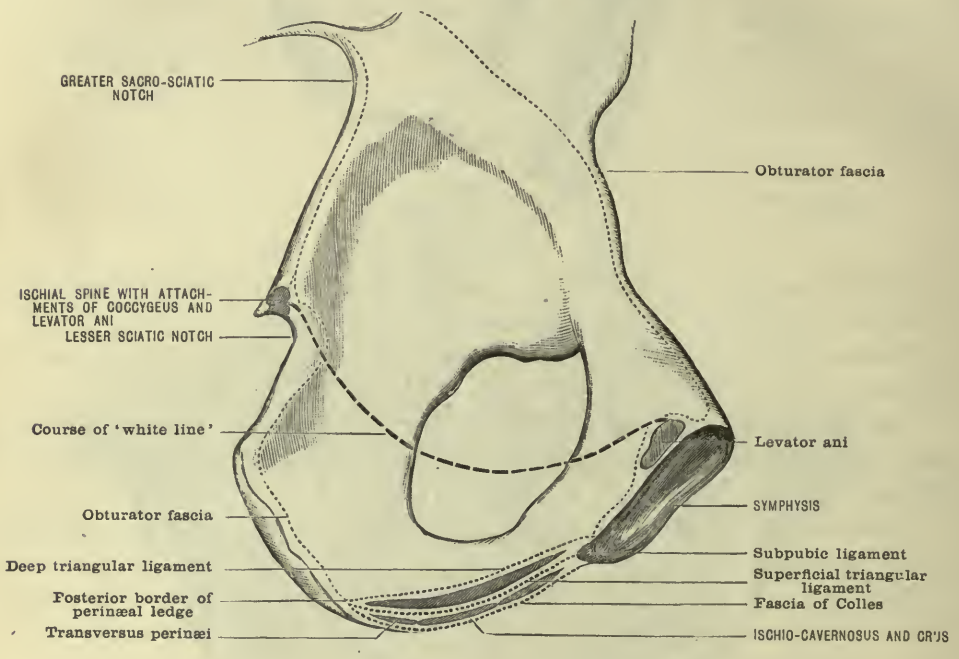
The **triangular ligament** or deep perineal fascia stretches across the pubic arch from the symphysis, where it is connected with the subpubic ligament, back to the transverse perineal muscle, where it joins with Colles's fascia. It consists of two layers,—superficial, or inferior, layer, and the deep, or superior, layer. *Remember, in describing the fascia, the body is in the upright position.*

The **superficial** layer of the triangular ligament is attached on the sides to the rami of the os pubis and ischium, anteriorly to the subpubic ligament, as stated above, posteriorly it is connected with the central

tendinous point, and is continuous with Colles's fascia, the anal and ischio-rectal fascia.

The **deep** layer of the triangular ligament is a continuation of the obturator fascia across the pubic arch. The obturator fascia is attached to the rami of the pubis and ischium and then passes across the pubic arch as the deep triangular ligament, joining the superficial layer of the triangular ligament posteriorly.

FIG. 212.—DIAGRAM SHOWING LINES OF ATTACHMENT OF THE FASCIÆ AND MUSCLES OF THE PELVIS. (W. A.) (*Morris.*)



Between the superficial layer and deep layer of the triangular ligament is a space known as the deep **perineal interspace.**

Remove the superficial layer of the triangular ligament, thus opening up the deep perineal interspace and exposing the structures between the two layers of the triangular ligament.

These structures are (see Figs. 209, 213):—

Membranous urethra, Cowper's glands, internal pudic artery and vein, artery to bulb and crus, dorsal nerve to penis, deep transverse or compressor urethræ (*M. constrictor urethræ*), transverse perineal, and profundus of Henle muscles. Study each of the above structures.

Review the internal pudic artery and branches, and pudic nerve and branches. What is Alcock's canal?

FIG. 213.—DIAGRAM TO SHOW THE TRIANGULAR LIGAMENT OF THE URETHRA OR DEEP PERINEAL FASCIA.—(*Holden.*)

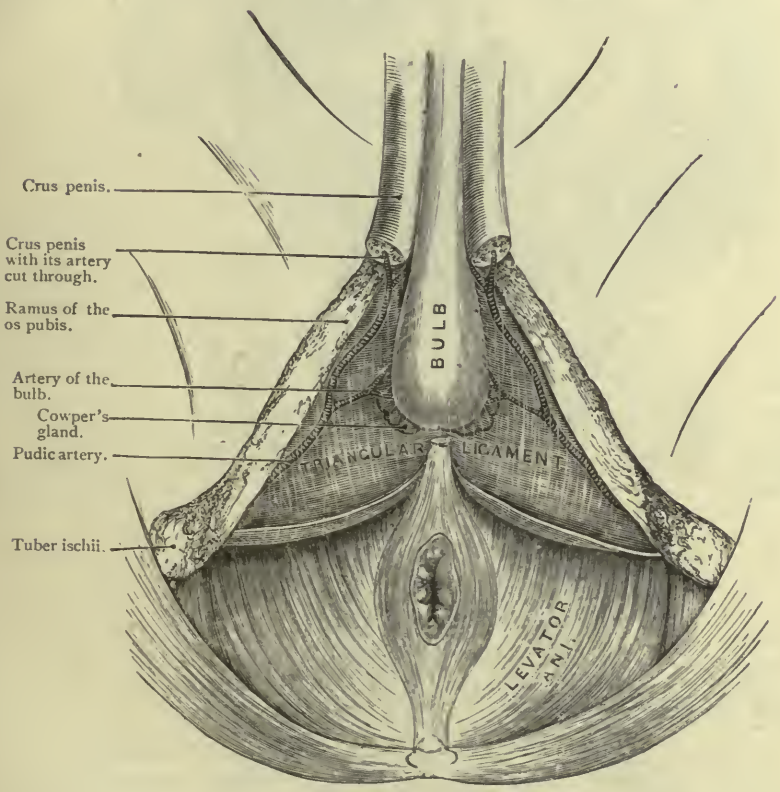


FIG. 214.—DIAGRAM OF THE RELATIONS OF THE COMPRESSOR URETHRÆ AS SEEN FROM ABOVE.—(*Holden.*)

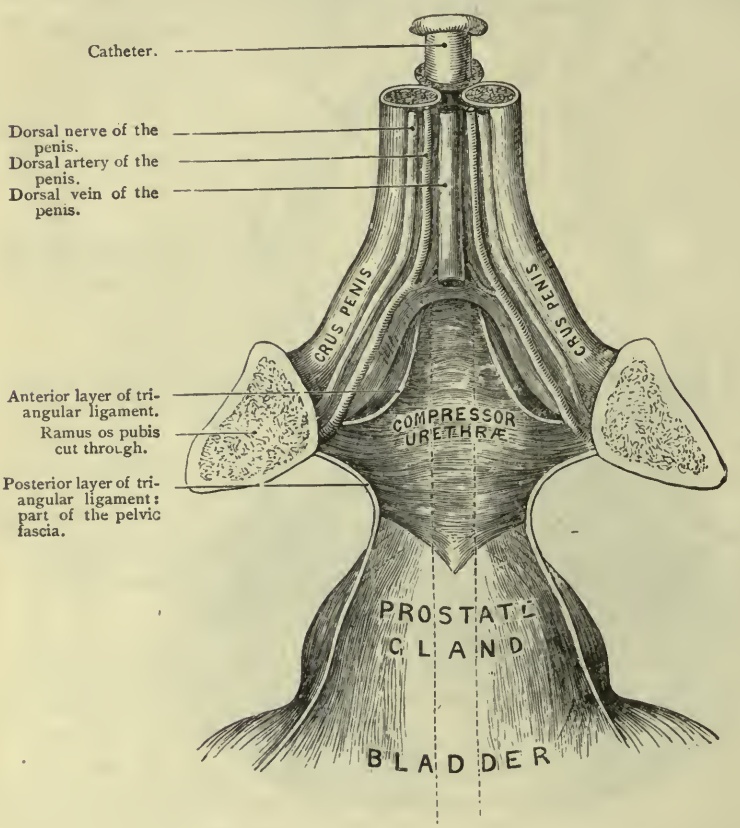


FIG. 215.—SIDE VIEW OF THE PELVIC VISCERA.—(*Holden.*)
(Taken from a Photograph.)

1. External sphincter. 2. Internal sphincter. 3. Levator ani cut through. 4. Accelerator urinæ. 5. Membranous part of the urethra, surrounded by compressor muscle. 6. Prostate gland. 7. Vesicula seminalis. 8. Ureter. 9. Vas deferens. 10. Crus penis divided. 11. Triangular ligament. 12. Superficial perineal fascia. 13. Rectum.

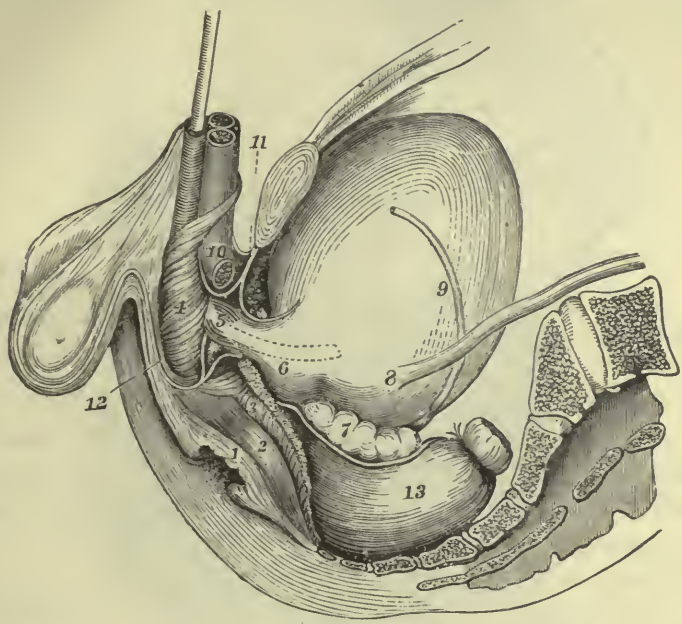
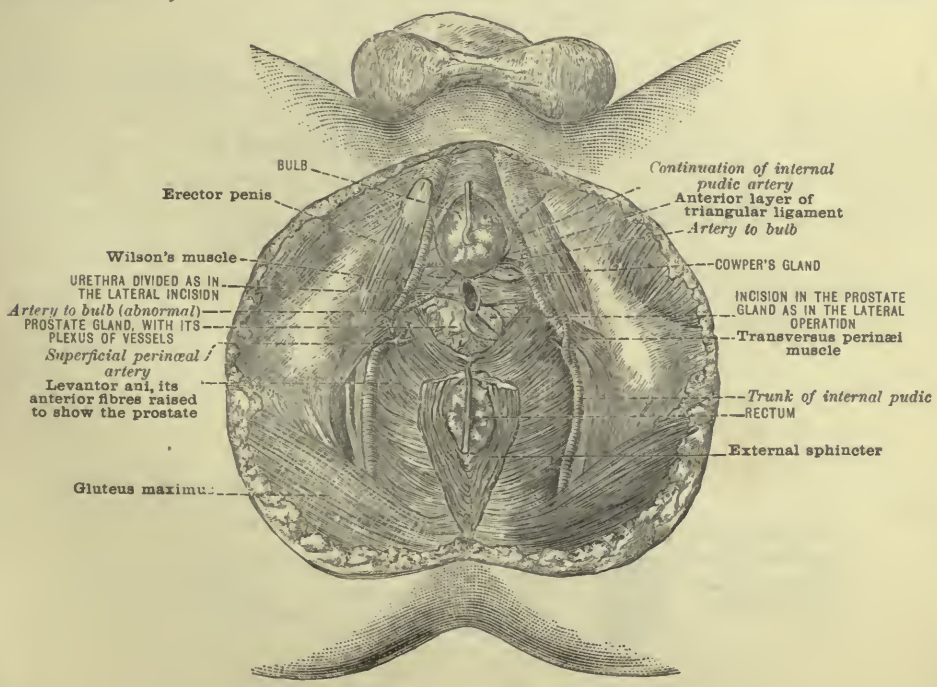


FIG. 216.—DEEP DISSECTION OF MALE PERINÆUM. (Roser.) (*Morris.*)

The bulb is slightly raised and the rectum drawn backwards, in order to make clear the membranous urethra and prostate, which are shown incised as in the lateral operation of lithotomy.


BULB
Erector penis
Wilson's muscle
URETHRA DIVIDED AS IN THE LATERAL INCISION
Artery to bulb (abnormal)
PROSTATE GLAND, WITH ITS PLEXUS OF VESSELS
Superficial perinæal artery
Levantor ani, its anterior fibres raised to show the prostate
Gluteus maximus
Continuation of internal pudic artery
Anterior layer of triangular ligament
Artery to bulb
COWPER'S GLAND
INCISION IN THE PROSTATE GLAND AS IN THE LATERAL OPERATION
Transversus perinæi muscle
Trunk of internal pudic
RECTUM
External sphincter

Locate and study the following muscles:—

Levator ani. (See Figs. 217, 218, 219.)

Pubo-coccygeus.

Ilio-coccygeus.

Coccygeus.

Obturator internus.

FIG. 217.—MUSCLES OF THE FLOOR OF THE PELVIS.—(*Morris.*)

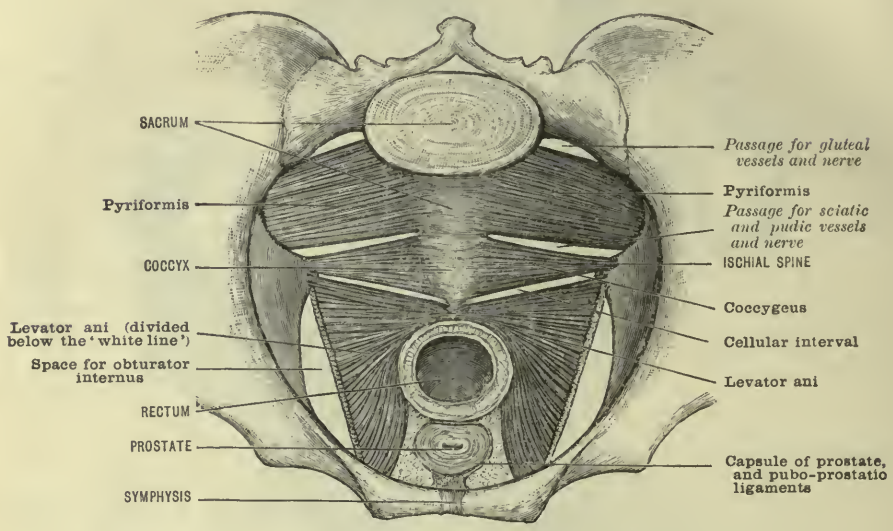


FIG. 218.—DIAGRAM OF THE PELVIC FASCIÆ.—(*Morris.*)

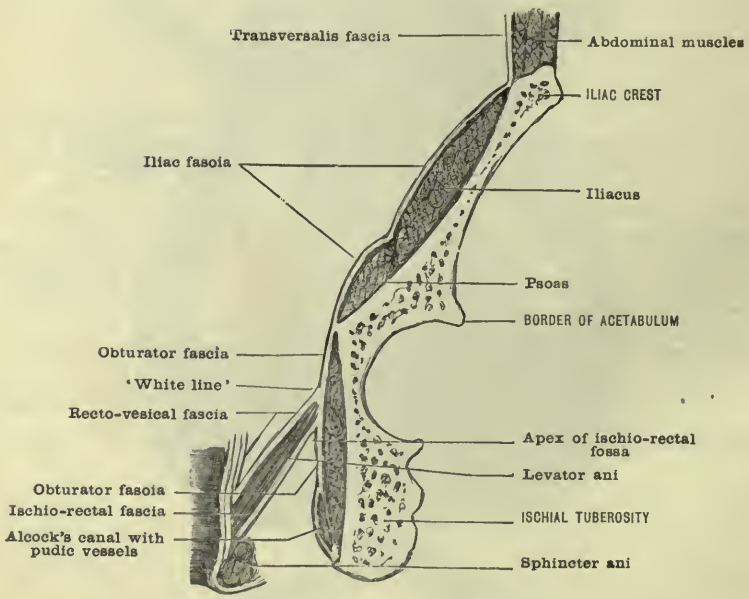
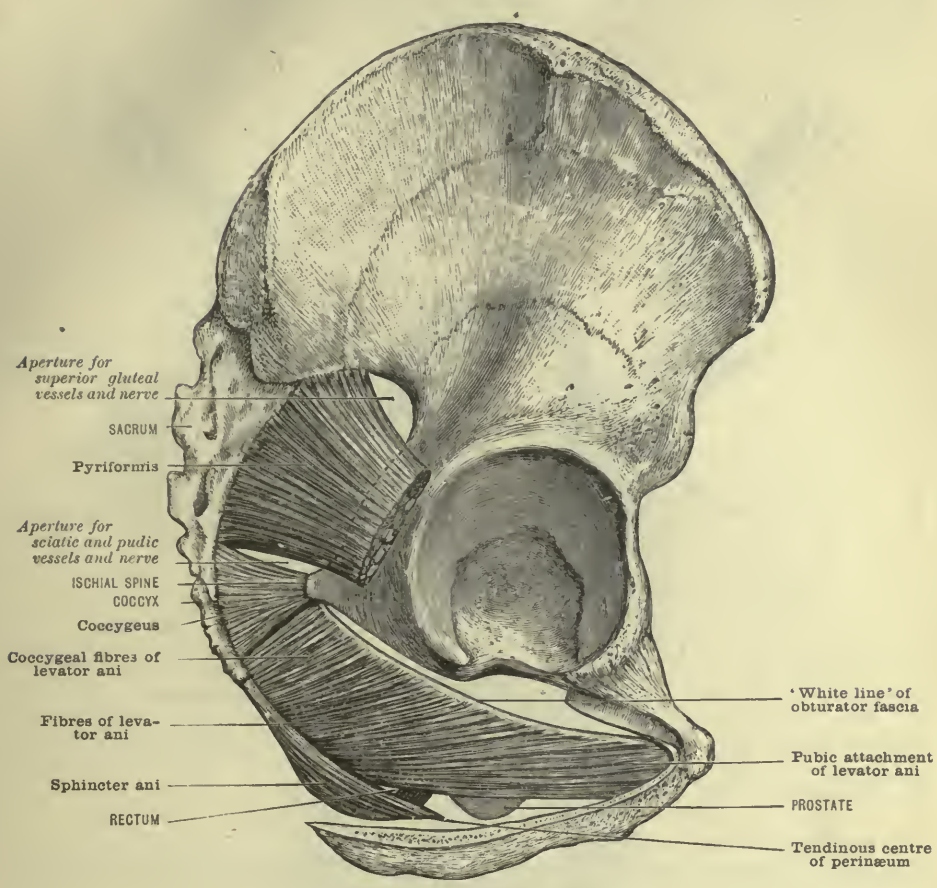


FIG. 219.—MUSCLES OF THE FLOOR OF THE PELVIS. (W. A.) (*Morris.*)
(A portion of the ischial and pubic bones sawn away.)



PELVIC FASCIA.

To expose the pelvic fascia remove the peritoneum. Note the loose connective tissue between the peritoneum and fascia about the bladder.

Study a description of the pelvic fascia. Notice, first, to what parts of the pelvis the fascia is attached, and then, second, the manner in which it is reflected on the pelvic viscera.

Trace the fascia, beginning with the iliac fascia, with which the pelvic fascia is continuous, into the pelvis, notice its division into recto-vesical, obturator, and anal, or ischio-rectal, fasciæ.

FIG. 220.—TRANSVERSE SECTION OF THE PELVIS, TO SHOW THE REFLECTIONS OF THE PELVIC FASCIA. (*After Gray.*) (*Holden.*)

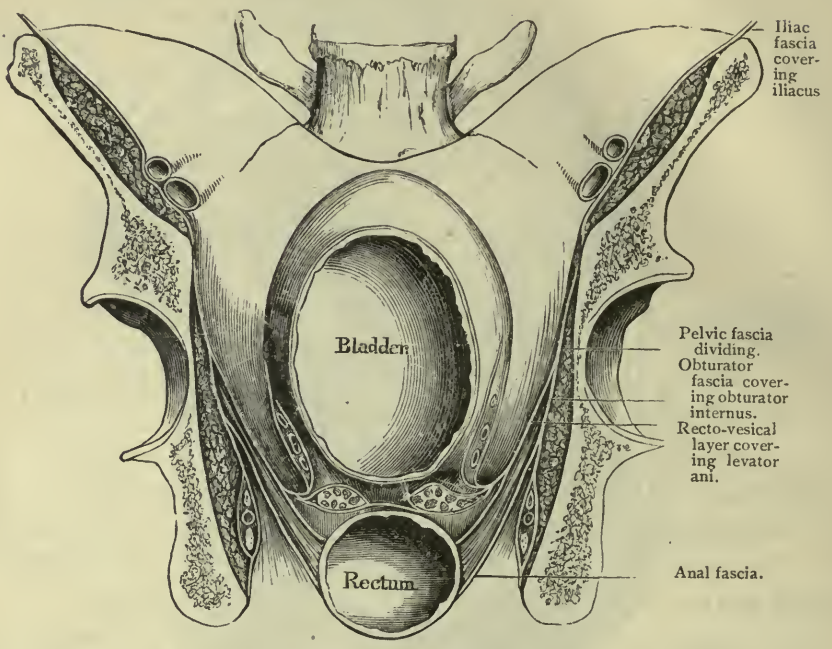
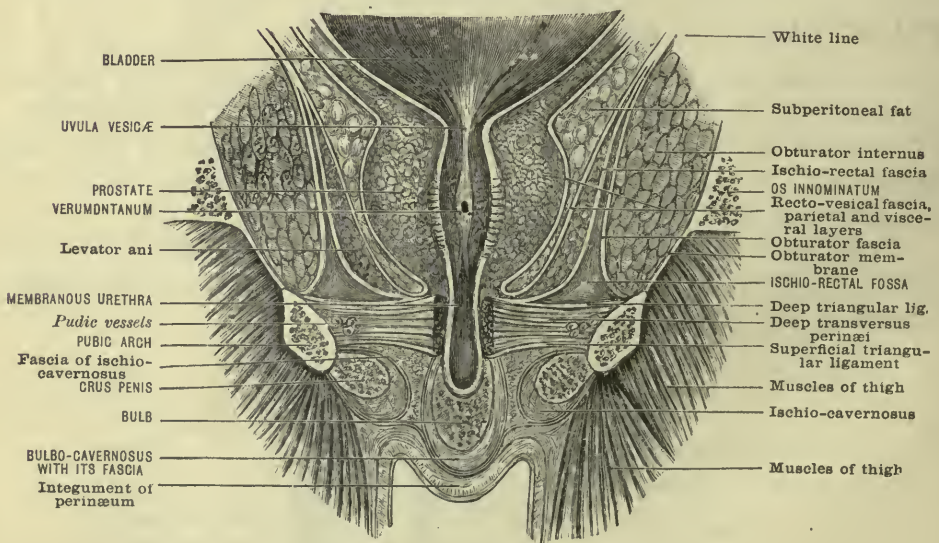


FIG. 221.—VERTICAL FRONTAL SECTION OF THE PELVIS, SHOWING FASCIÆ.—(*Morris.*) (Modified from Braune.)



FEMALE PERINEUM.

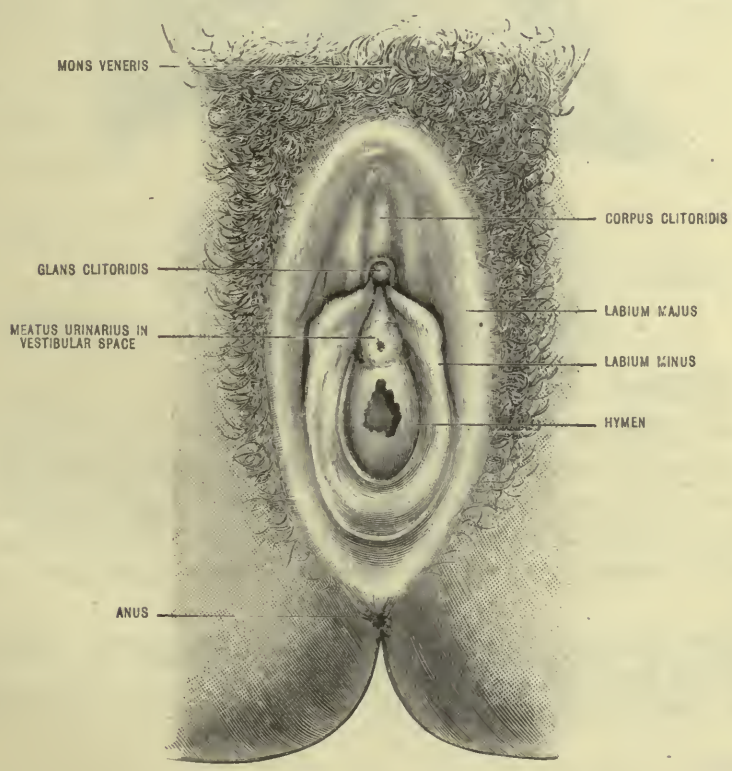
Follow the same general order and directions as those given for the dissection of the male perineum, noting the differences in the organs and the provisions made for their accommodations.

Study the external organs of generation:—

- Mons veneris.
- Vulva.
  - Labia majora.
  - Labia minora.
  - Clitoris.
  - Vestibule.
  - Fourchette.
- Glands of Bartholin.
- Vagina.
- Hymen.
- Bulbi vestibuli.

Study urethra,—position, size, and plexus of veins.

FIG. 222.—THE EXTERNAL GENITALS OF THE FEMALE.—(*Morris.*)

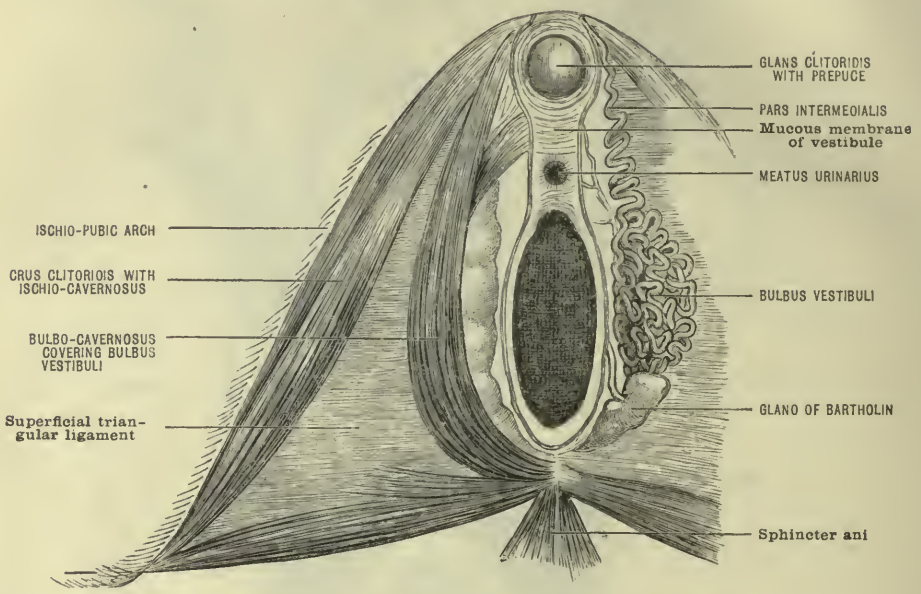


Examine the osseous and ligamentous boundaries of the lower aperture of the pelvis. What difference exists between the male and female pelvis?

Distend the rectum moderately with tow and sew the edges of the anus together; also sew the edges of the labia majora together.

Dissection: Proceed on the same plan as in the dissection of the male perineum, following the same directions, looking up the same figures, noting the differences, where they exist.

FIG. 223.—DIAGRAMMATIC REPRESENTATION OF THE PERINEAL STRUCTURES IN THE FEMALE.—(*Morris.*)



DEMONSTRATION IX.

PELVIC VISCERA.

Remove the **pelvic viscera.**

Draw down the penis and separate it from the pudic arch. Divide the transversus perinæi and levator ani close to their insertions, detach the sphincter ani from its attachment to the coccyx. Remove the organs of generation, rectum, and bladder with the remaining kidney and ureter attached.

In the female separate the clitoris from the pubic arch; then proceed the same as in removing the male organs.

Dissect the rectum from the rest of the organs.

Rectum:—

Clean and study the rectum,—position and relation to surrounding parts, peritoneum, recto-vesical or recto-vaginal pouch, **anus, internal sphincter** muscle, mucous membrane, and rectal or Houston's valves.

Describe the blood- and nerve-supply.

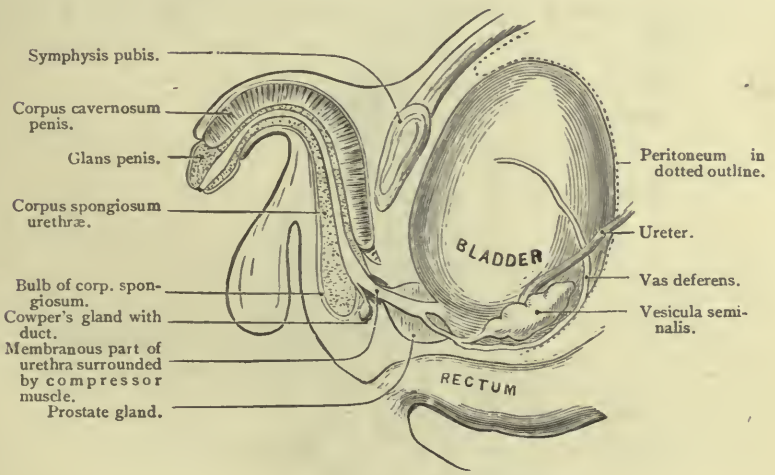
Male Reproductive Organs.—

Prostate gland:—

Expose the prostate gland and vesiculæ seminales by following down the vas deferens, dissecting away the tissue about the neck of the bladder and the posterior inferior surface of the bladder.

FIG. 224.—POSTERIOR VIEW OF THE BLADDER.—(*Holden.*)
1. Ureter. 2. Vas deferens. 3. Vesicula seminalis. 4. Trigone. 5. Prostate.

FIG. 225.—DIAGRAM OF THE RELATIVE POSITION OF THE PELVIC VISCERA.—(*Holden.*)



Describe the **prostate gland, vesiculæ seminales, vas deferens,** and **ejaculatory duct,**—position, function, blood- and nerve-supply of each.

FIG. 226.—VASA DEFERENTIA AND VESICULÆ SEMINALES. (After Sappey.) (*Morris.*)

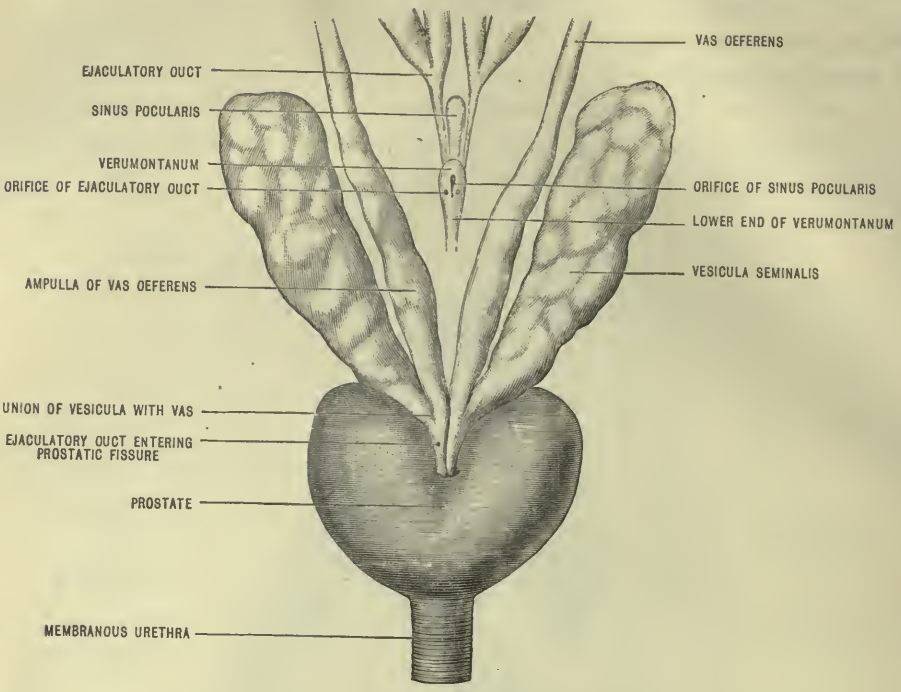
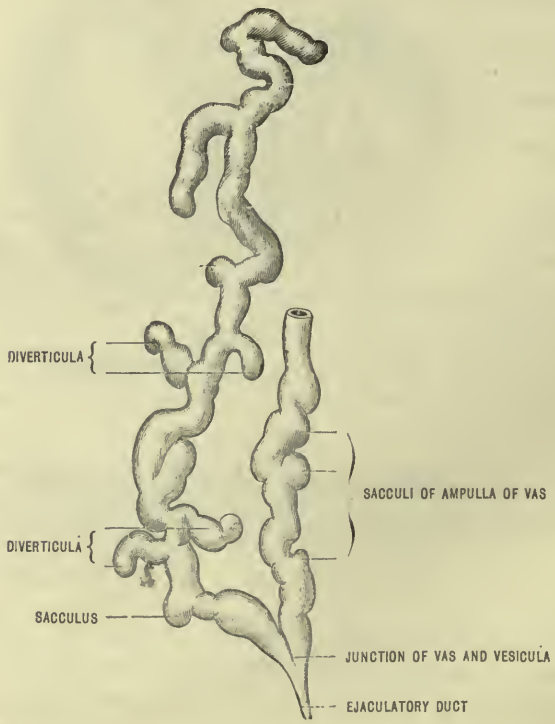


FIG. 227.—VAS DEFERENS AND VESICULA SEMINALIS DISSECTED. (After Sappey.) (*Morris.*)

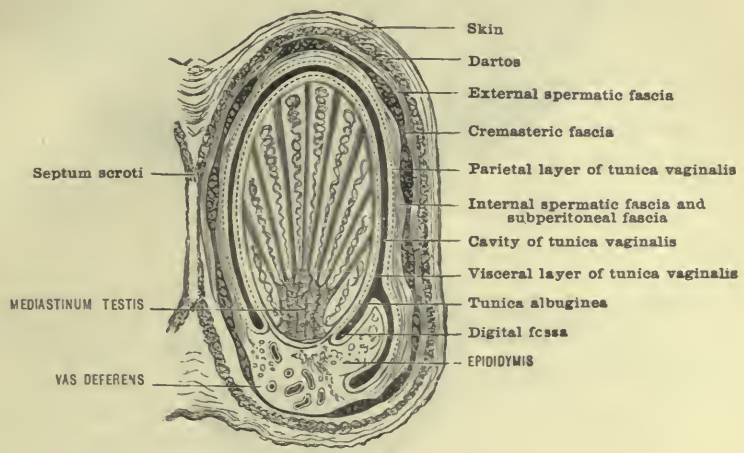


Testes and their **coverings.**

General description of the testes. Position in fœtal life and their descent.

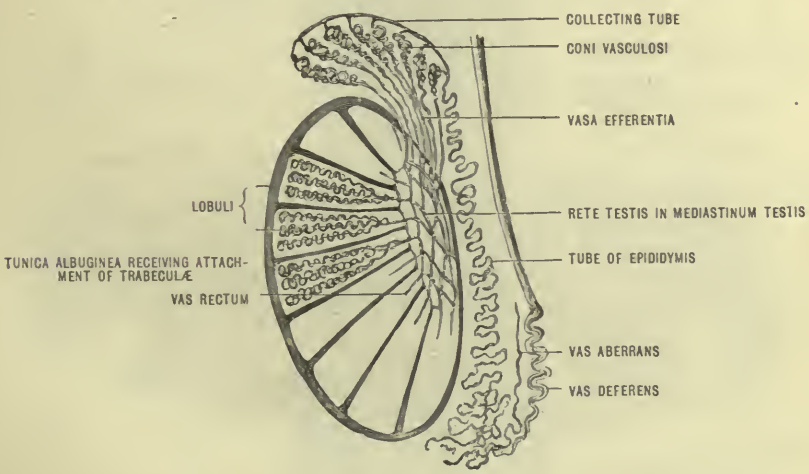
Describe the **coverings** of the testes.

FIG. 228.—HORIZONTAL SECTION OF THE SCROTUM AND TESTICLE. (Diagrammatic.) (*Morris.*)



Open the scrotum and examine the testes, epididymis, and the beginning of the vas deferens. Describe each; also describe the spermatic cord.

FIG. 229.—DIAGRAM OF THE TESTICULAR TUBULES.—(*Morris.*)



Penis:—

Root, body, and glans penis. Study each part. What is the blood- and nerve-supply?

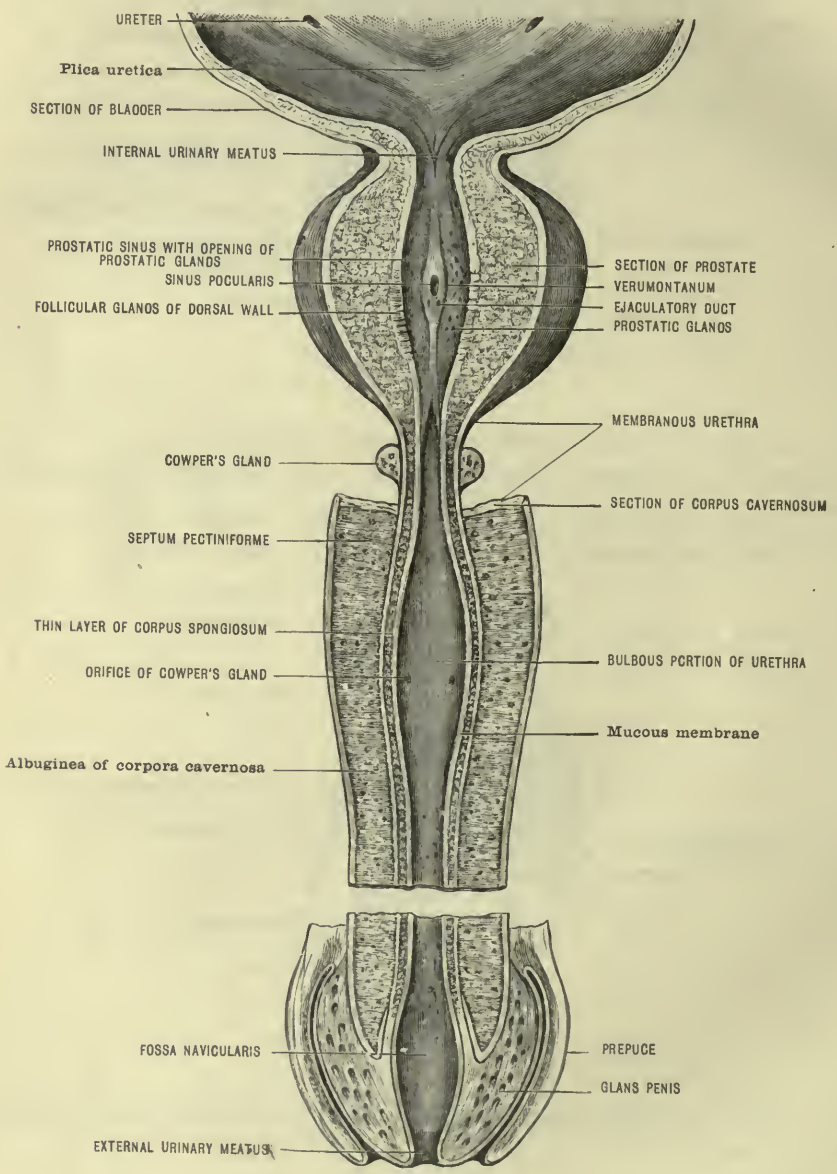
Bladder:—

Insert a blow-pipe through the urethra and distend with air, and dry the bladder.

Study its external surface, walls, and structures, ligaments, form when distended and when empty.

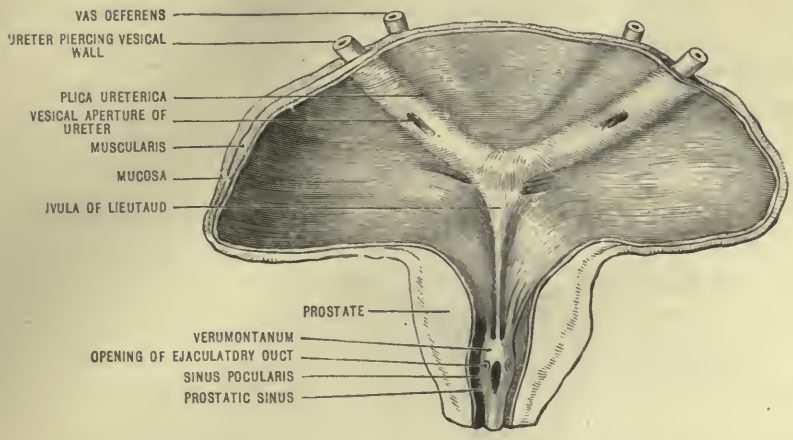
Open the bladder by making an incision through the **anterior** wall along the median line; extend the incision along the superior wall of the **penis,** thus laying open the bladder and urethra.

FIG. 230.—THE MALE URETHRA, CLEFT DORSALLY TO SHOW VENTRAL MUCOUS WALL.—(*Morris.*)



Examine and study the inner surface of the bladder.
What difference between male and female bladder?

FIG. 231.—THE POSTERIOR WALL OF THE BLADDER. (After Henle.) (*Morris.*)



Examine and study the urethra. (See Fig. 230.)
What difference between male and female urethra?

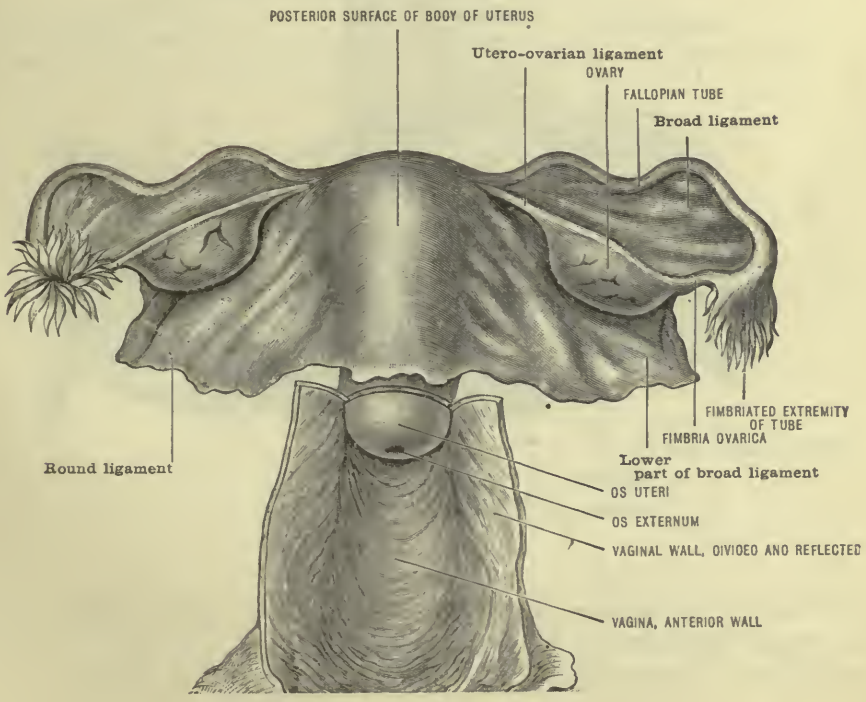
Female reproductive organs.

Review the external organs.

Vagina:—

Open the vagina by a posterior incision through its wall. Note its mucous membrane and the intra-vaginal cervix. Describe the vagina.

FIG. 232.—THE FEMALE ORGANS OF GENERATION. (Modified from Sappey.) (*Morris.*)
(Vagina divided and laid open behind.)



Uterus:—

Examine the uterus with its broad ligaments, Fallopian tubes, round ligaments and ovaries attached.

Open the uterus by a posterior median incision.

Study uterus and ligaments; and ovaries.

FIG. 233.—FRONTAL SECTION OF THE VIRGIN UTERUS. (After Sappey.) (*Morris.*)

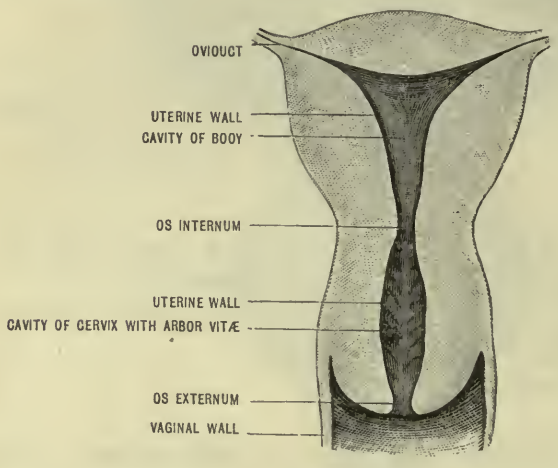
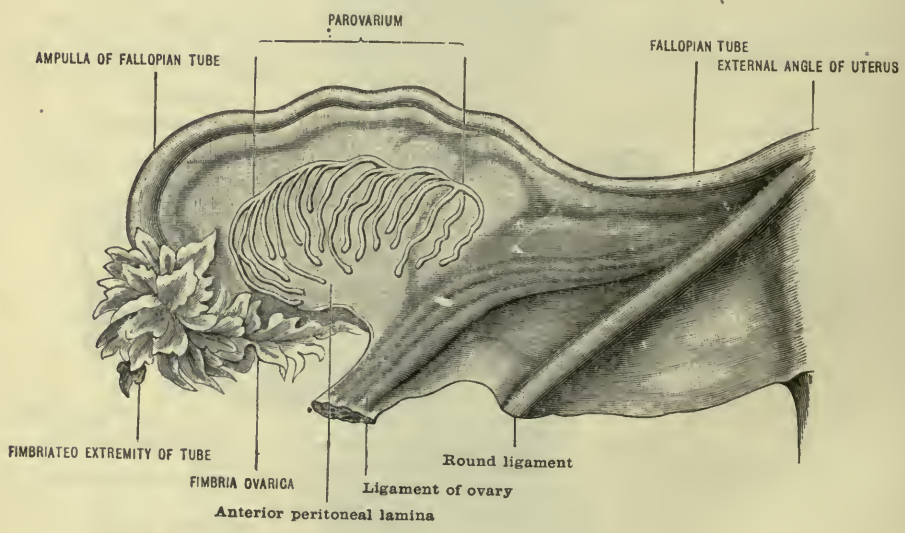


FIG. 234.—THE BROAD LIGAMENT AND ITS CONTENTS, SEEN FROM THE FRONT.—(*Morris.*) (After Sappey.)

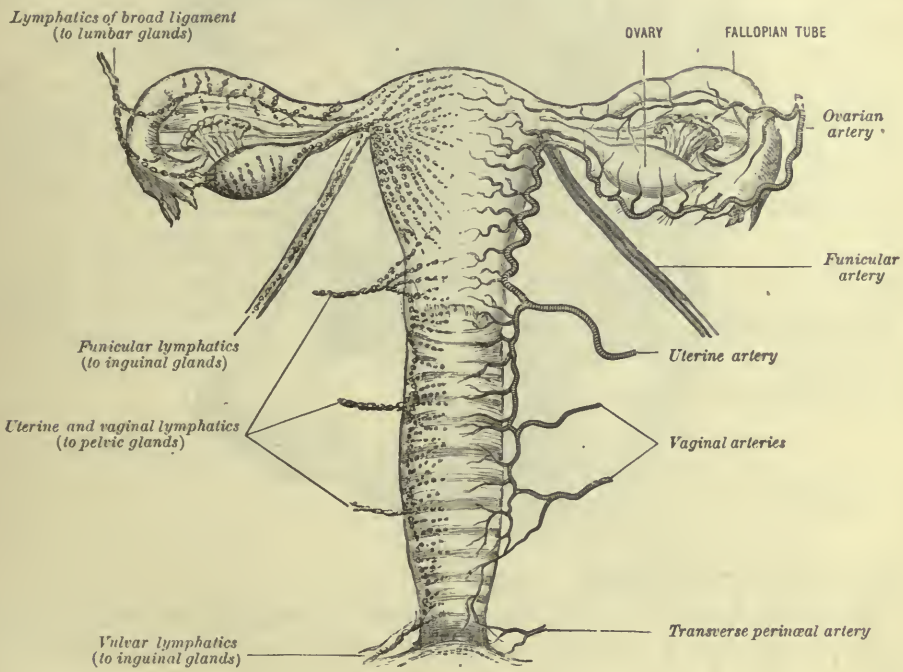
Also see Fig. 232.



What is the blood- and nerve-supply of the uterus, vagina, ovaries, and broad ligaments? (Figs. 205, 235.)

Study the lymphatics of the pelvic and abdominal viscera.

FIG. 235.—DIAGRAM OF THE ARTERIES AND LYMPHATICS OF THE FEMALE GENERATIVE ORGANS.—(*Morris.*)

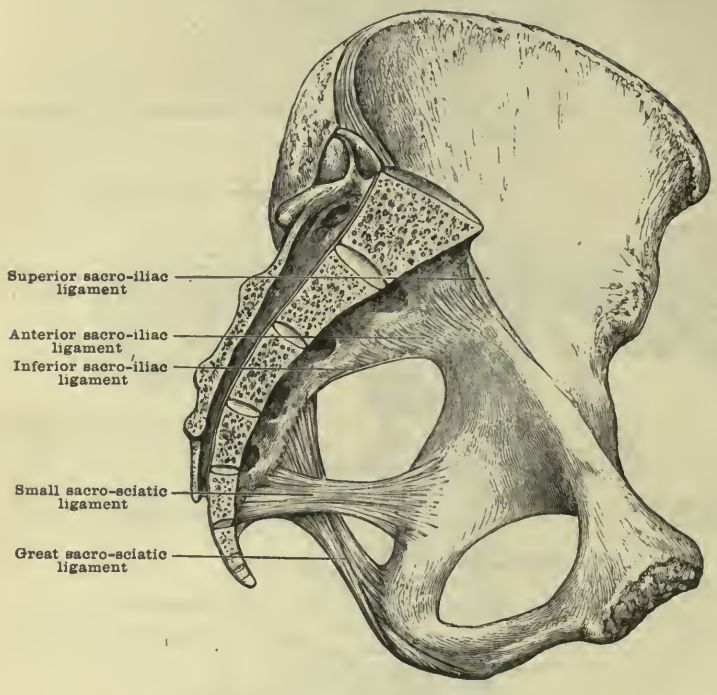


DEMONSTRATION X.

CAVITY OF THE PELVIS.

Examine the pelvis on an articulated skeleton. True pelvis; false pelvis. Note the important ligaments of the pelvis.

FIG. 236.—VERTICAL ANTERO-POSTERIOR SECTION OF THE PELVIS.—(*Morris.*)



Review the **pelvic fascia.**

Divide the body transversely in the lumbar region just above the crest of the ilium, and then through the middle line of the sacrum and symphysis of pubis.

Now expose the **internal iliac artery** and its branches, and internal iliac vein and its tributaries.

FIG. 237.—SIDE VIEW OF PELVIS AND UPPER THIRD OF THIGH, WITH THE EXTERNAL ILIAC, INTERNAL ILIAC, AND FEMORAL ARTERIES AND THEIR BRANCHES, LEFT SIDE. (From a dissection by W. J. Walsham in the Museum of St. Bartholomew's Hospital.) The bladder is hooked over to expose back of pelvis.

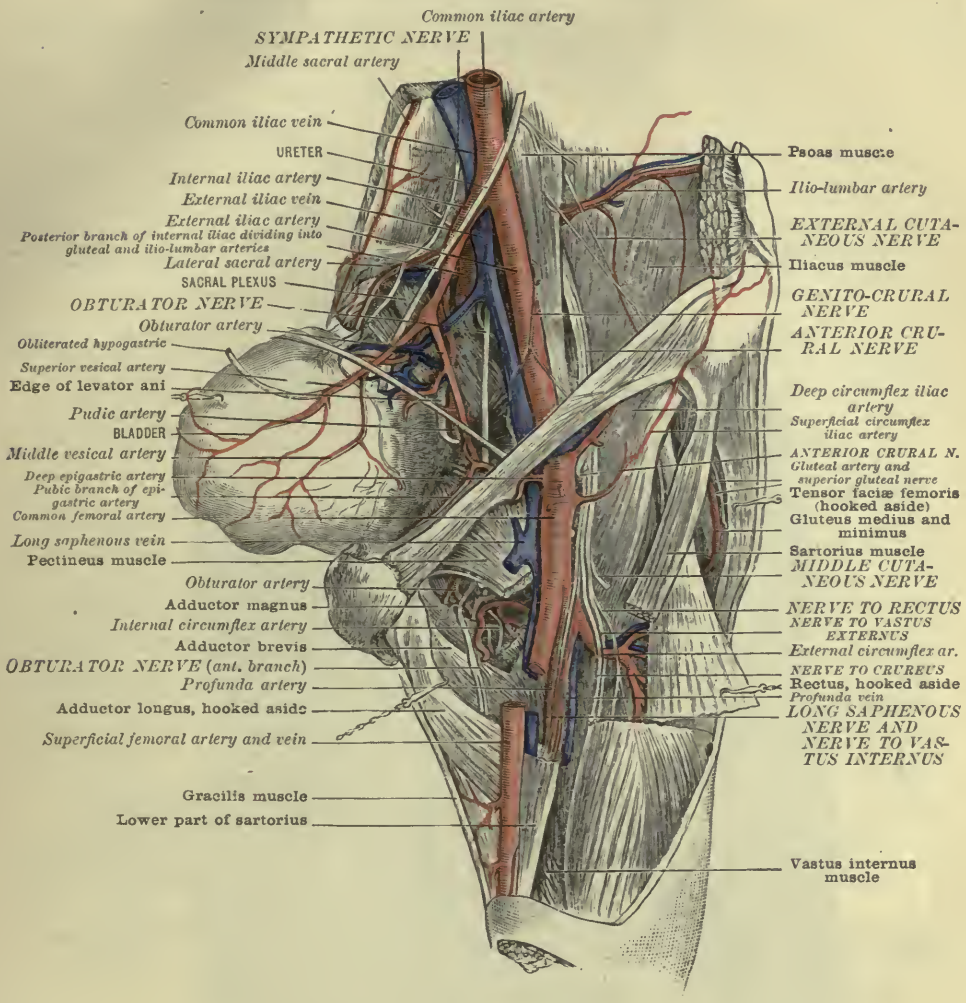
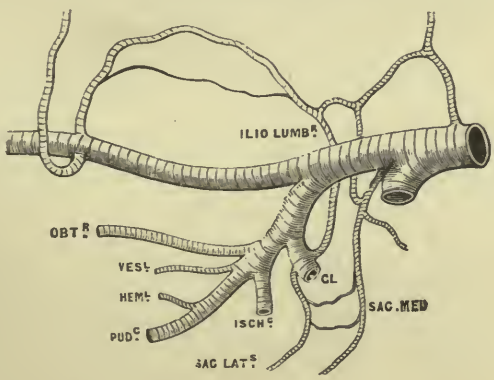


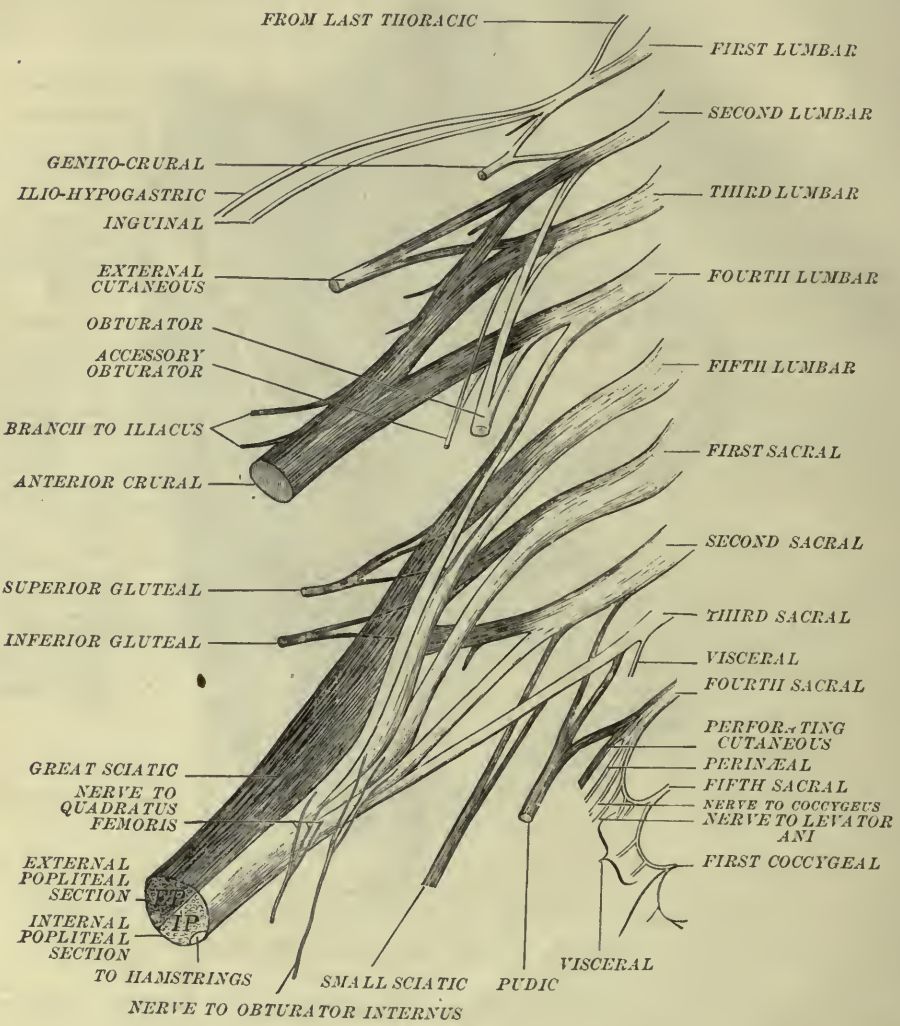
FIG. 238.—PLAN OF THE BRANCHES OF THE INTERNAL ILIAC ARTERY.—(*Holden.*)



Sacral plexus.

Plan of formation of pelvic plexus.

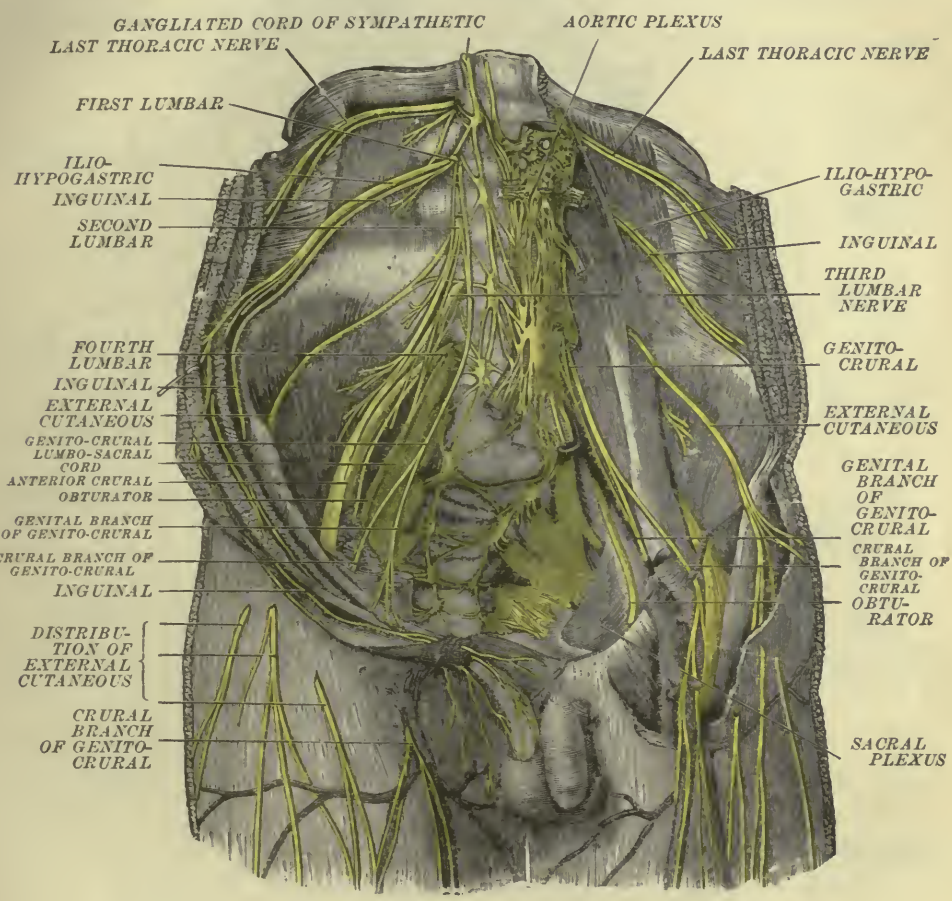
FIG. 239.—DIAGRAM OF THE LUMBAR AND SACRAL PLEXUSES. (Modified from Paterson.) (*Morris.*)



Expose the sacral plexus by removing from its anterior surface pelvic fascia. The sciatic and internal pudic arteries also lie anterior to the sacral plexus, pelvic fascia lying between the arteries and the plexus of nerves.

Trace the **branches** of the sacral plexus to where they pass out of the pelvis.

FIG. 240.—BRANCHES OF THE LUMBAR AND SACRAL PLEXUS VIEWED FROM BEFORE. (After Hirschfeld and Leveillé.) (*Morris.*)



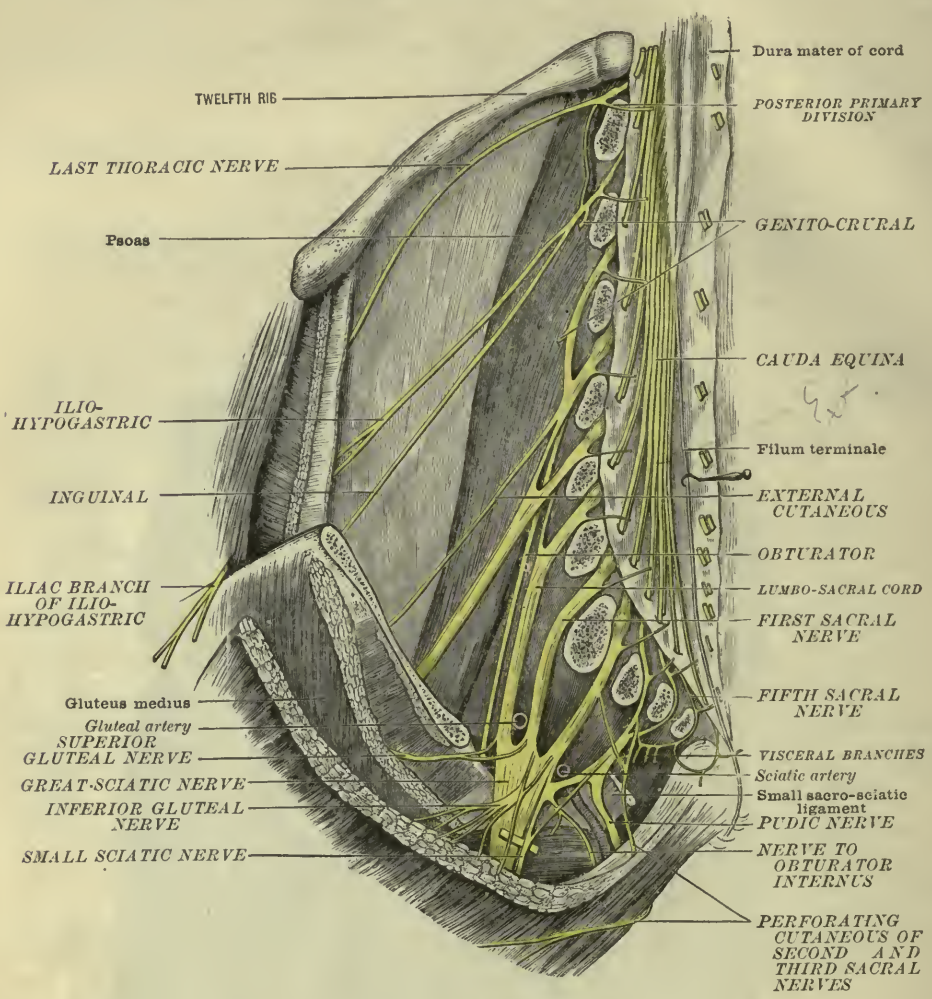
Also expose the:—

Fifth sacral nerve.
Coccygeal nerve.
Sacro-coccygeal plexus.

FIG. 241.—A DISSECTION OF THE LUMBAR AND SACRAL PLEXUSES, FROM BEHIND.—(*Morris.*)

(The anterior crural nerve is placed between the external cutaneous and obturator nerves.)

Also see Fig. 240.



Sympathetic nerves:—

Trace down into the pelvis the **gangliated cord.**

Pelvic plexus:—

Offsets of the pelvic plexus.

Hemorrhoidal.

Vesical.

Prostatic in male.

Vaginal in female.

Uterine in female.

Muscles:—

Examine the pyriformis, coccygeus, obturator internus, and origin of levator ani. (See Figs. 217, 218.)

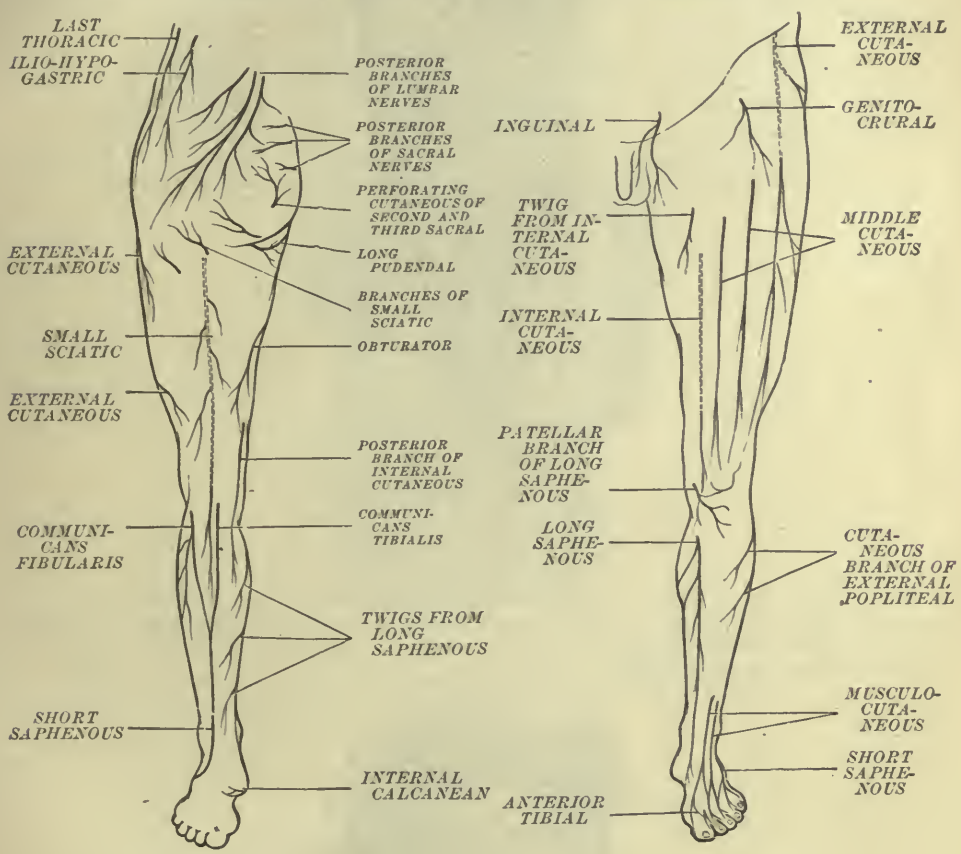
Locate the **white line.** (See Fig. 219.)

DEMONSTRATION XI.

GLUTEAL REGION.

Dissection: Make an incision through the skin from the tip of the coccyx, carrying it obliquely downward and outward to the anterior side of the thigh four inches below the great trochanter. Turn the skin off, exposing the gluteus maximus muscle. Notice the cutaneous nerves.

FIG. 242.—DISTRIBUTION OF CUTANEOUS NERVES ON THE POSTERIOR AND ANTERIOR ASPECTS OF THE INFERIOR EXTREMITY.—(*Morris.*)



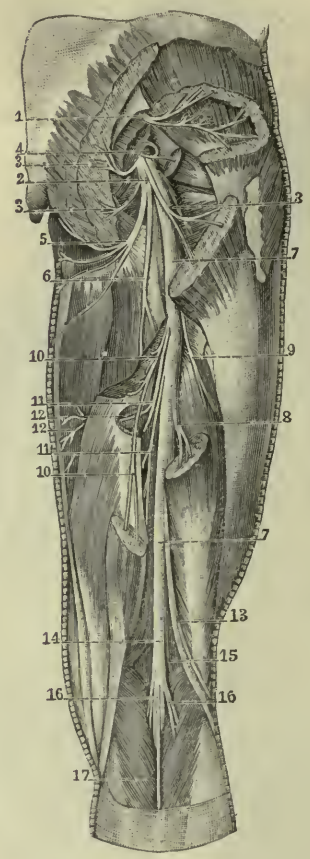
Gluteus maximus muscle. (See Fig. 243.)

Clean and study the muscle. Then separate its border and cut it transversely at its origin, and as you turn it down notice the structures beneath and the inferior gluteal nerve passing into the muscle. Cut this nerve and turn the muscle down to its insertion.

Gluteus medius muscle is now exposed. (See Fig. 246.)

Study this muscle. Cut it at its origin and turn it down to its insertion with care so as not to destroy the structures beneath.

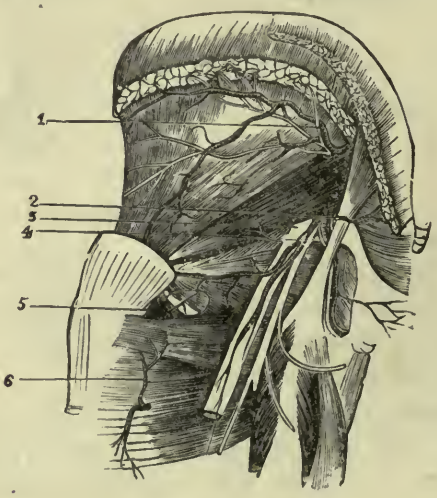
FIG. 243.—THE GREAT SCIATIC NERVE, WITH ITS COLLATERAL AND TERMINAL BRANCHES.—(*Holden.*)



1. Superior gluteal nerve.
2. Inferior gluteal or lesser sciatic.
3, 3, 3. Its branch to the gluteus maximus.
4. Branch to the pyriformis.
5. Genital branch of the lesser sciatic.
6. Femoro-popliteal of the same nerve.
7, 7. Trunk of the great sciatic.
8, 9. Branch to the long and short heads of the biceps.
10, 10. Branch to the semi-tendinosus.
11, 11. Branches to the semi-membranosus.
12, 12. Branch to the adductor magnus.
13. External popliteal or peroneal.
14. Internal popliteal.
15. Filament to the plantaris muscle.
16, 16. Branches to the gastrocnemius.
17. Origin of the external saphenous nerve.

FIG. 244.—THE ARTERIES OF THE GLUTEAL REGION.—(*Holden.*)

1. Gluteal artery and nerve. 2. Pudic artery and nerve, and nerve to obturator internus. 3. Great sacro-sciatic nerve. 4. Sciatic artery. 5. Internal circumflex artery. 6. The first perforating artery.



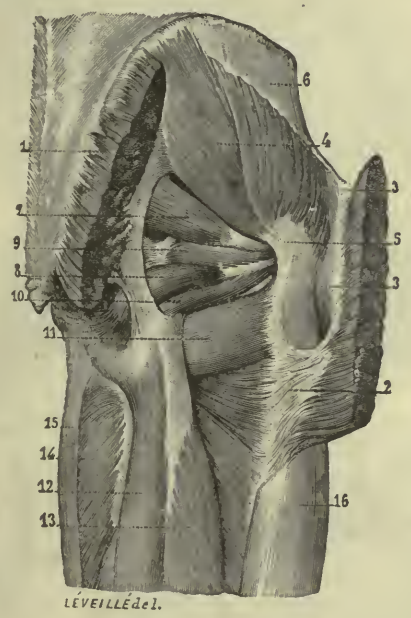
Gluteus minimus muscle is now exposed. (See Fig. 246.)

Study this muscle in place; do not remove it.

Pyriformis muscle is also exposed. Clean and study the muscle. Note its relation to the structures coming out through the obturator foramen. Do not remove the pyriformis muscle. (See Fig. 246.)

FIG. 245.—MUSCLE BENEATH THE GLUTEUS MAXIMUS.—(*Holden.*)

1. Origin of gluteus maximus divided. 2. Its insertion into the oblique line. 3, 3. Its insertion into the fascia lata. 4. Gluteus medius. 5. Its insertion. 6. Fascia lata, showing continuity with insertion of the gluteus maximus. 7. Pyriformis. 8. Obturator internus. 9. Gemellus superior or cephalad. 10. Gemellus inferior. 11. Quadratus femoris. 12. Semi-membranosus. 13. Biceps. 14. Adductor magnus. 15. Gracilis. 16. Vastus externus.



Nerves exposed in this region (see Figs. 247 and 248):—

Inferior gluteal.
Small sciatic.
Great sciatic (*N. ischiadicus*).
Pudic.
Superior gluteal (Fig. 243).

Arteries (see Fig. 246):—

Gluteal (*a. gluteæ superior*).
Sciatic (*a. gluteæ inferior*).
Internal pudic.

FIG. 246.—THE GLUTEAL REGION, WITH THE GLUTEAL, SCIATIC, AND PUDIC ARTERIES.—(*Morris.*)

(From a dissection by W. J. Walsham in St. Bartholomew's Hospital Museum.)

The inferior gluteal branch of the sciatic artery has been drawn inwards over the tuber ischii with the reflected origin of the gluteus maximus muscle.

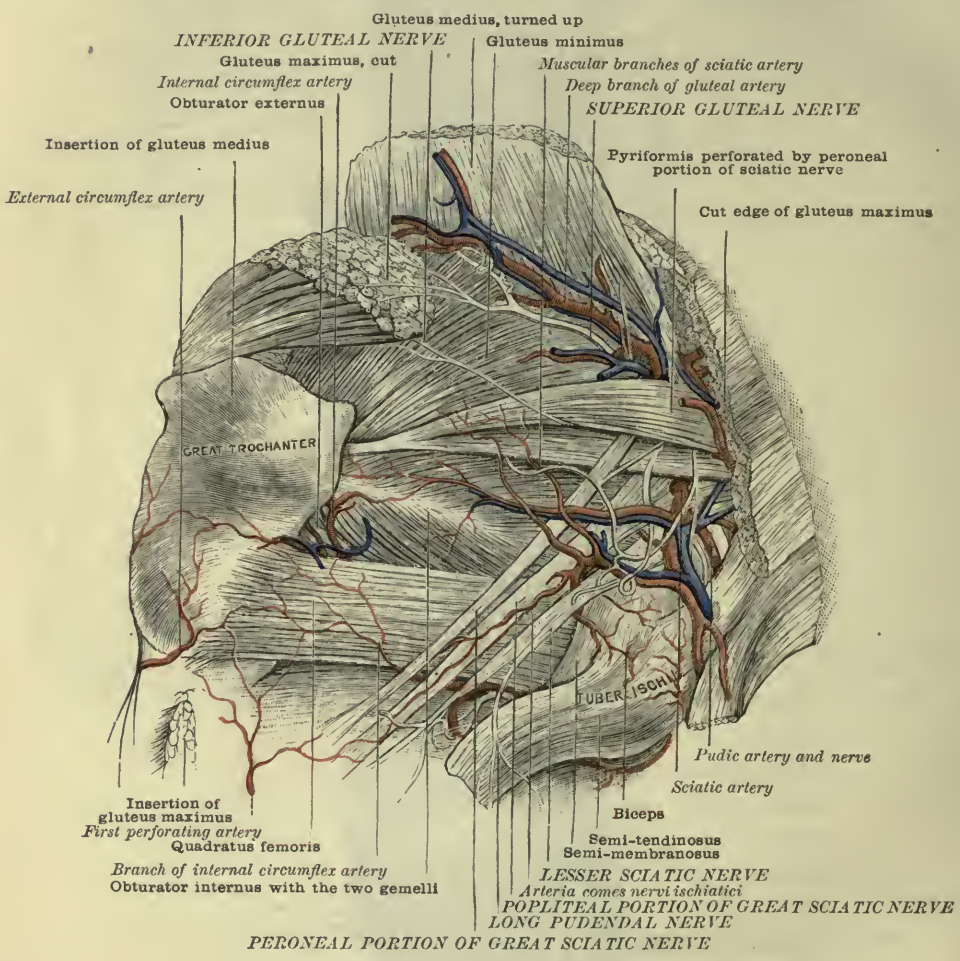
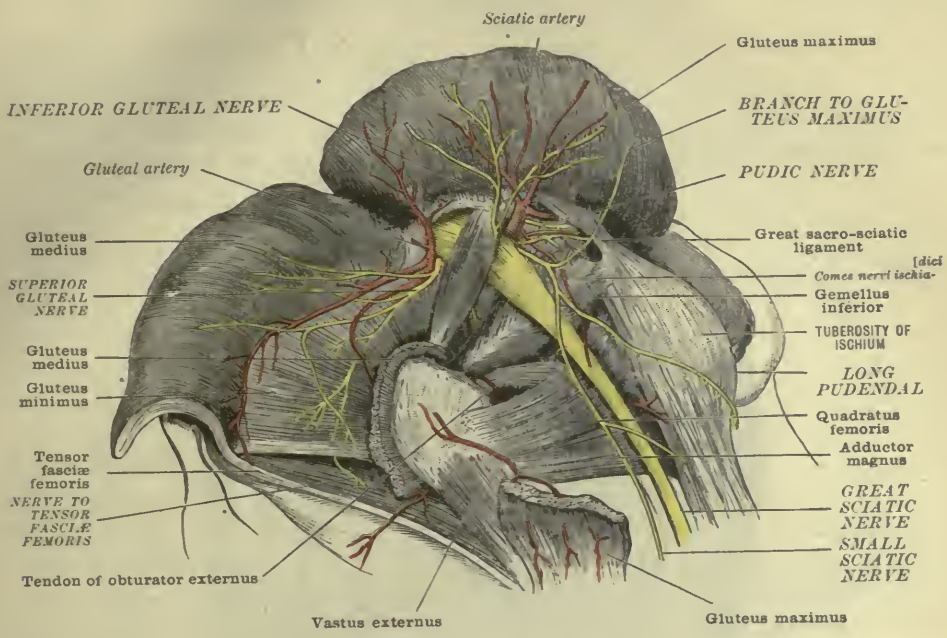


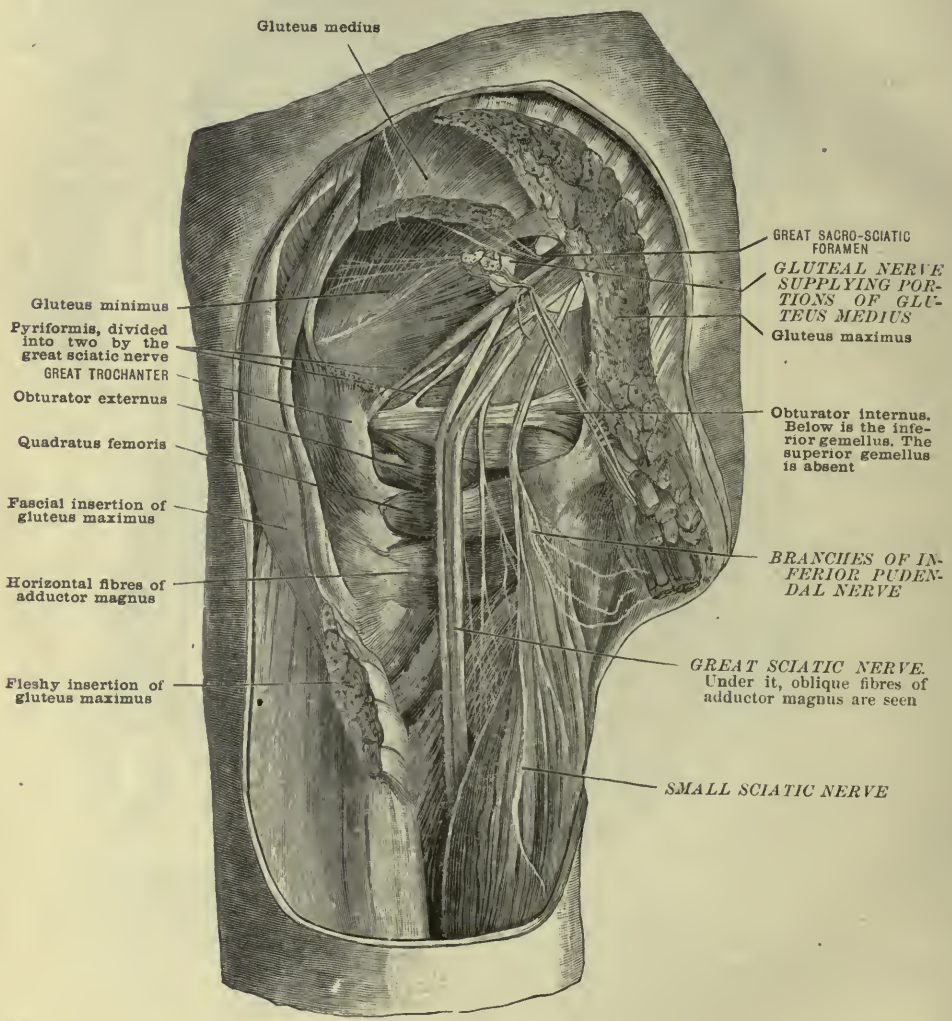
FIG. 247.—A DISSECTION OF THE NERVES IN THE GLUTEAL REGION.—(*Morris.*)
(The gluteus maximus and gluteus medius have been divided near their insertions, and thrown upwards.)



Muscles. Expose and study (see Fig. 246):—

Pyriformis.
Gemellus superior.
Gemellus inferior.
Obturator internus.
Obturator externus.
Study obturator membrane.
Quadratus femoris.

FIG. 248.—DEEP DISSECTION OF THE GLUTEAL REGION. (From a preparation in the Hunterian Museum.) (*Morris.*)
Also see Fig. 245.


Gluteus medius
GREAT SACRO-SCIATIC FORAMEN
GLUTEAL NERVE SUPPLYING PORTIONS OF GLUTEUS MEDIUS
Gluteus minimus
Pyriformis, divided into two by the great sciatic nerve
GREAT TROCHANTER
Obturator externus
Gluteus maximus
Obturator internus. Below is the inferior gemellus. The superior gemellus is absent
Quadratus femoris
Fascial insertion of gluteus maximus
BRANCHES OF INFERIOR PUDENDAL NERVE
Horizontal fibres of adductor magnus
GREAT SCIATIC NERVE. Under it, oblique fibres of adductor magnus are seen
Fleshy insertion of gluteus maximus
SMALL SCIATIC NERVE

DEMONSTRATION XII.

ANTERIOR FEMORAL REGION.

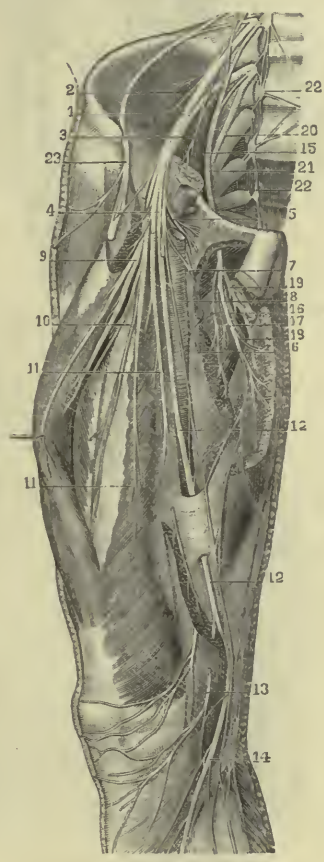
Cutaneous nerves (Fig. 242).

Outline superficial veins of leg and thigh (Fig. 250).

Superficial lymphatics of leg and thigh (Fig. 250).

Outline femoral artery. (See Fig. 257.)

FIG. 249.—NERVES ON THE ANTERIOR OR VENTRAL PART OF THE THIGH.—(*Holden.*)



1. The crural.
2. Branch to the iliacus.
3. Filament to the psoas magnus.
4. Three branches of the crural to the skin, divided to show the deeper branches.
5, 6. Muscular filaments of the superficial portion.
7. Internal cutaneous, which pierces the fascia lata.
8. Anastomosing branch of the internal cutaneous.
9. Branch to the rectus femoris.
10. Branch to the vastus externus.
11, 11. Branch to the vastus internus.
12, 12. Internal, or long, saphena nerve.
13. Patellar branch of this nerve.
14. Its vertical branch.
15. Obturator nerve.
16. Its branch to adductor longus.
17. Its branch to the adductor brevis.
18. Its branch to the gracilis.
19. Its branch to the adductor magnus.
20. Lumbo-sacral trunk.
21. Union of this trunk and the first sacral nerve.
22, 22. Lumbar and sacral portion of the sympathetic.
23. External cutaneous nerve.

Dissection.—Make an incision through the skin along the anterior part of the thigh from the middle of Poupart's ligament to just below the patella; turn the skin outward and inward. Note the structures beneath:—

Superficial fascia.

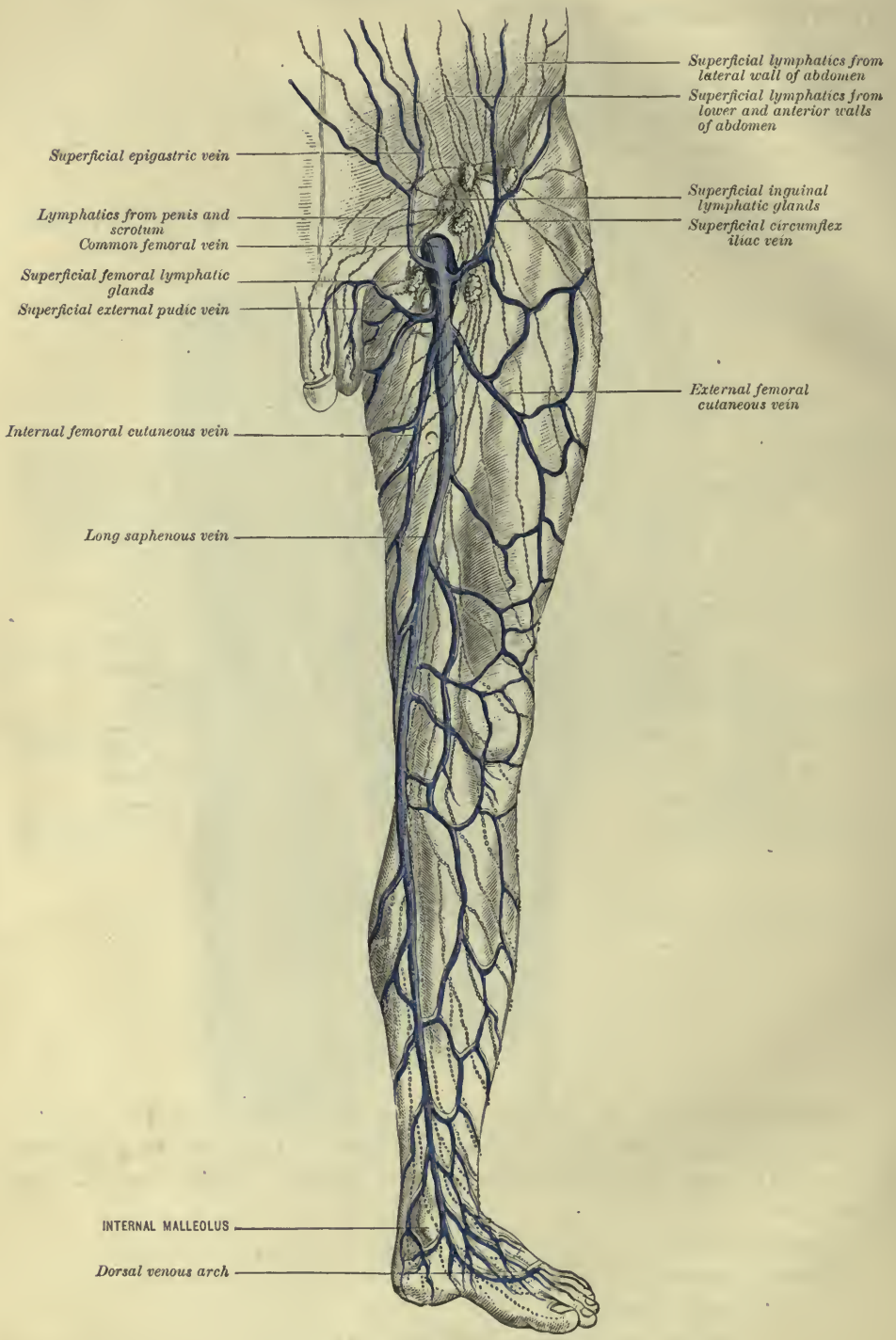
Superficial nerves. Trace:—

Anterior crural.

Middle cutaneous. (See Fig. 242.)

Internal cutaneous. (See Fig. 242.)

FIG. 250.—THE SUPERFICIAL VEINS AND LYMPHATICS OF THE LEFT LOWER LIMB. (Walsham.) (*Morris.*)


Superficial lymphatics from lateral wall of abdomen
Superficial lymphatics from lower and anterior walls of abdomen
Superficial epigastric vein
Superficial inguinal lymphatic glands
Lymphatics from penis and scrotum
Superficial circumflex iliac vein
Common femoral vein
Superficial femoral lymphatic glands
Superficial external pudic vein
External femoral cutaneous vein
Internal femoral cutaneous vein
Long saphenous vein
INTERNAL MALLEOLUS
Dorsal venous arch

External cutaneous. (See Fig. 242.)

Ilio-inguinal.

Genito-crural. (See Fig. 242.)

Superficial veins (see Fig. 250):—

Long saphenous and tributaries. (See Fig. 250.)

Trace the long saphenous vein up to where it passes through the saphenous opening in the fascia lata (Fig. 251).

Superficial arteries. The origin from the femoral:—

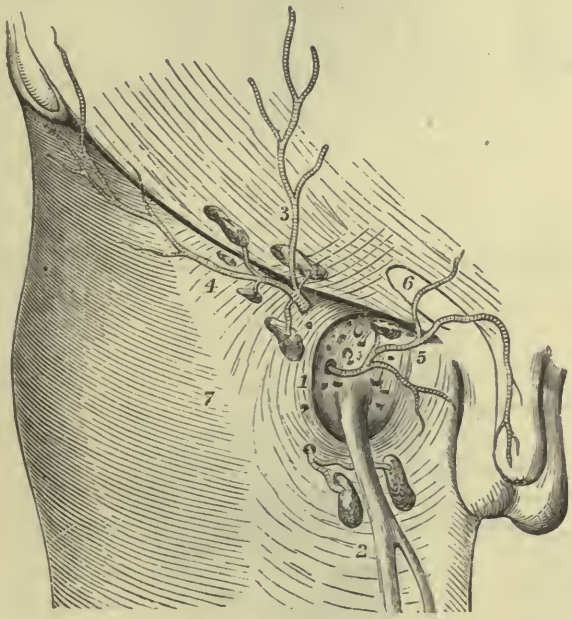
Superficial epigastric.

Superficial circumflex iliac.

Superficial external pudic.

FIG. 251.—SUPERFICIAL VESSELS AND GLANDS OF THE GROIN. SAPHENOUS OPENING WITH THE CRIBRIFORM FASCIA.—(*Holden.*)

1. Saphenous opening of the fascia lata. 2. Saphena vein. 3. Superficial epigastric a. 4. Superficial circumflexa illii a. 5. Superficial pudic a. 6. External abdominal ring. 7. Fascia lata of the thigh.



Examine and study the fascia lata.

Expose saphenous opening:—

Position, how formed, relation of cribriform fascia. (See Figs. 250 and 251, also 252.)

Locate Gimbernat's ligament (Figs. 252, 253).

Locate the femoral artery and vein under Poupart's ligament. The sheath of these vessels, called femoral, or crural, sheath, is formed in front by a continuation of the transversalis fascia, behind by a continuation of the iliac fascia. These fascia meet close to the femoral artery on the

iliac side, but a small space exists between femoral vein and where they meet on the pubic side; this is the **femoral** or **crural canal.**

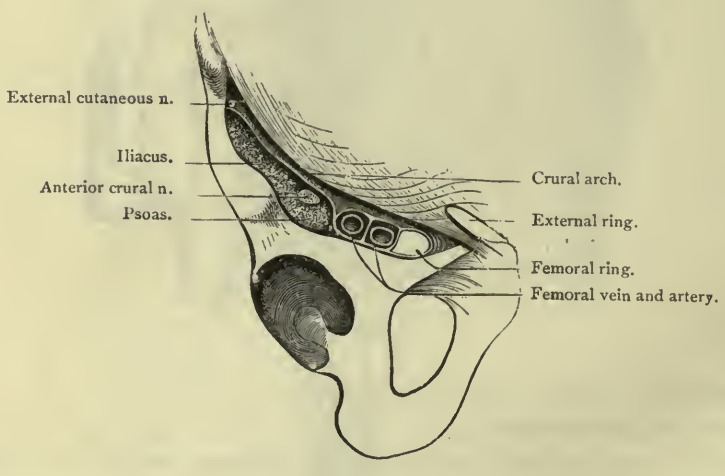
Locate and describe the femoral or crural canal, femoral or crural ring, septum crurale.

What are the coverings of femoral herniæ?

FIG. 252.—DIAGRAM OF THE FEMORAL RING AND THE SAPHENOUS OPENING.—(*Holden.*)
(The arrow is introduced into the femoral ring.)

1. Crural arch. 2. Saphenous opening of the fascia lata. 3. Saphena vein. 4. Femoral vein. 5. Gimbernat's ligament. 6. External abdominal ring. 7. Position of the internal ring in dotted outline.

FIG. 253.—POSITION OF PARTS UNDER THE CRURAL ARCH (VERTICAL SECTION).—(*Holden.*)



When the obturator artery comes from the external iliac artery what position may it occupy in relation to the femoral ring? (Figs. 254, 255.)

Study the anatomy concerned in femoral hernia.

Remove the fascia lata and expose the following structures:—

Nerves (see Fig. 249):—

Anterior crural and branches. *Trace the long or internal saphenous down to the knee.*

Scarpa's triangle.

Muscles (see Fig. 256):—

Sartorius.

Tensor vaginæ femoris.

Ilio-tibial band of fascia lata.

FIG. 254.—IRREGULARITIES OF THE OBTURATOR ARTERY. (After Gray.) (*Morris.*)

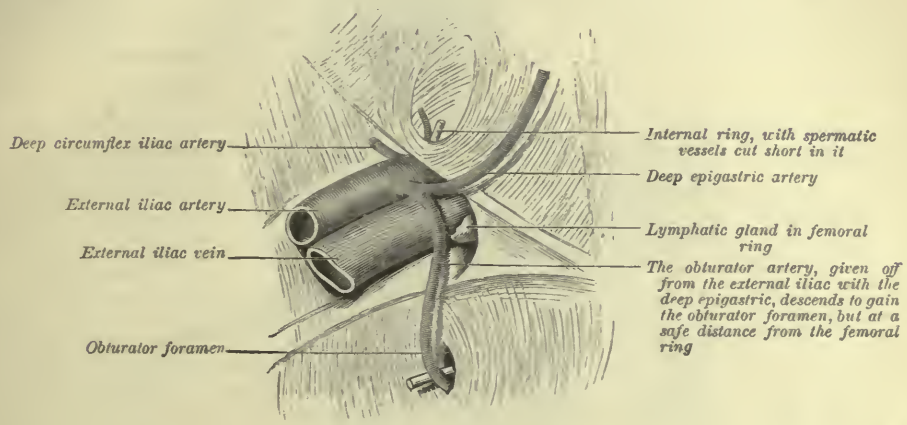
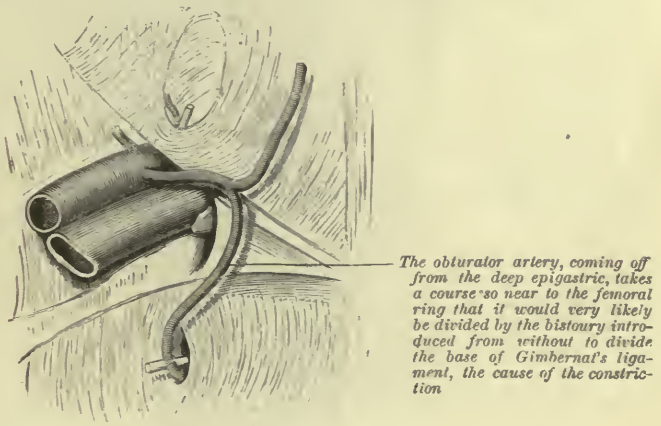

Deep circumflex iliac artery
External iliac artery
External iliac vein
Obturator foramen
Internal ring, with spermatic vessels cut short in it
Deep epigastric artery
Lymphatic gland in femoral ring
The obturator artery, given off from the external iliac with the deep epigastric, descends to gain the obturator foramen, but at a safe distance from the femoral ring

FIG. 255.—IRREGULARITIES OF THE OBTURATOR ARTERY. (After Gray.) (*Morris.*)


The obturator artery, coming off from the deep epigastric, takes a course so near to the femoral ring that it would very likely be divided by the bistoury introduced from without to divide the base of Gimbernat's ligament, the cause of the constriction

Quadriceps extensor.

Rectus femoris.

Vastus externus (*M. vastus lateralis*).

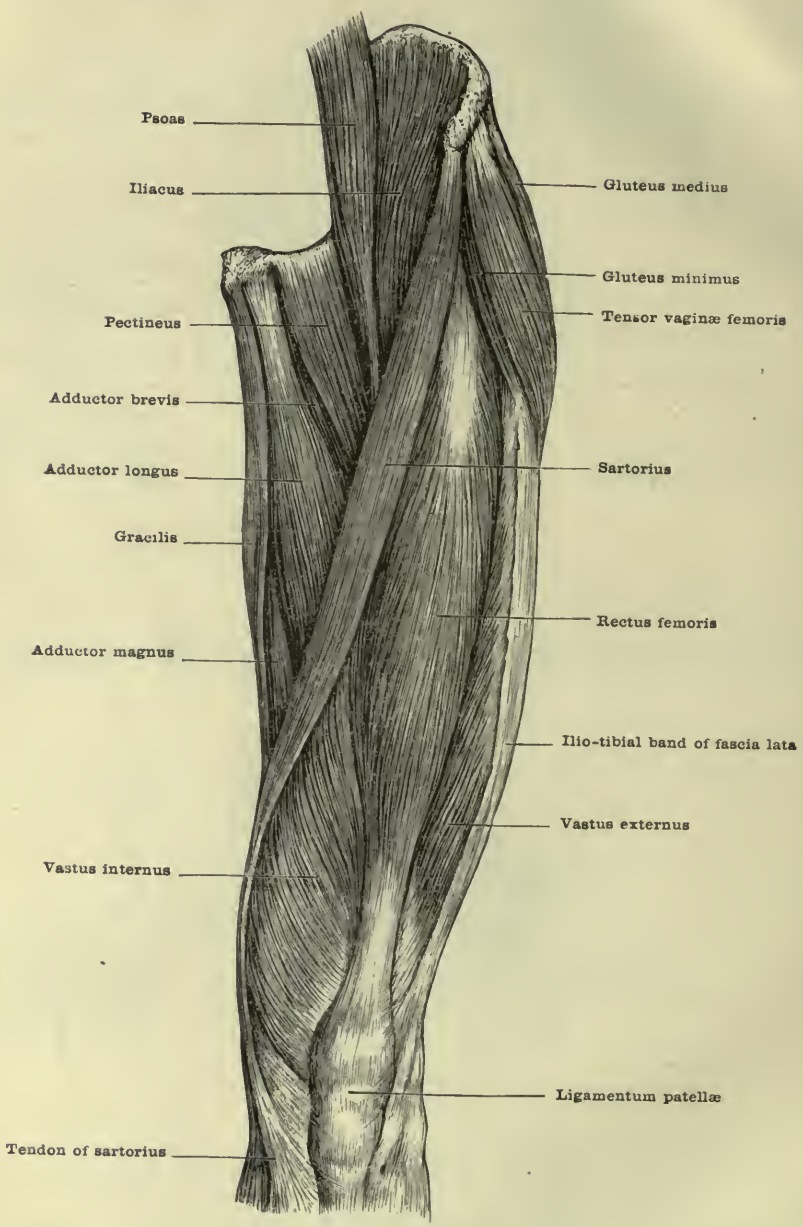
Vastus internus (*M. vastus medialis*).

Crureus (*M. vastus intermedialis*).

Ligamentum patellæ.

Expose and study these muscles, but do not remove any of them.

FIG. 256.—MUSCLES OF THE FRONT OF THE THIGH.—(*Morris.*)



Arteries:—

Common femoral and branches.
Superficial femoral and branches.
Deep femoral will be followed later.

FIG. 257.—SIDE VIEW OF PELVIS AND UPPER THIRD OF THIGH, WITH THE EXTERNAL ILIAC, INTERNAL ILIAC, AND FEMORAL ARTERIES AND THEIR BRANCHES, LEFT SIDE. (From a dissection by W. J. Walsham in the Museum of St. Bartholomew's Hospital.) The bladder is hooked over to expose back of pelvis.

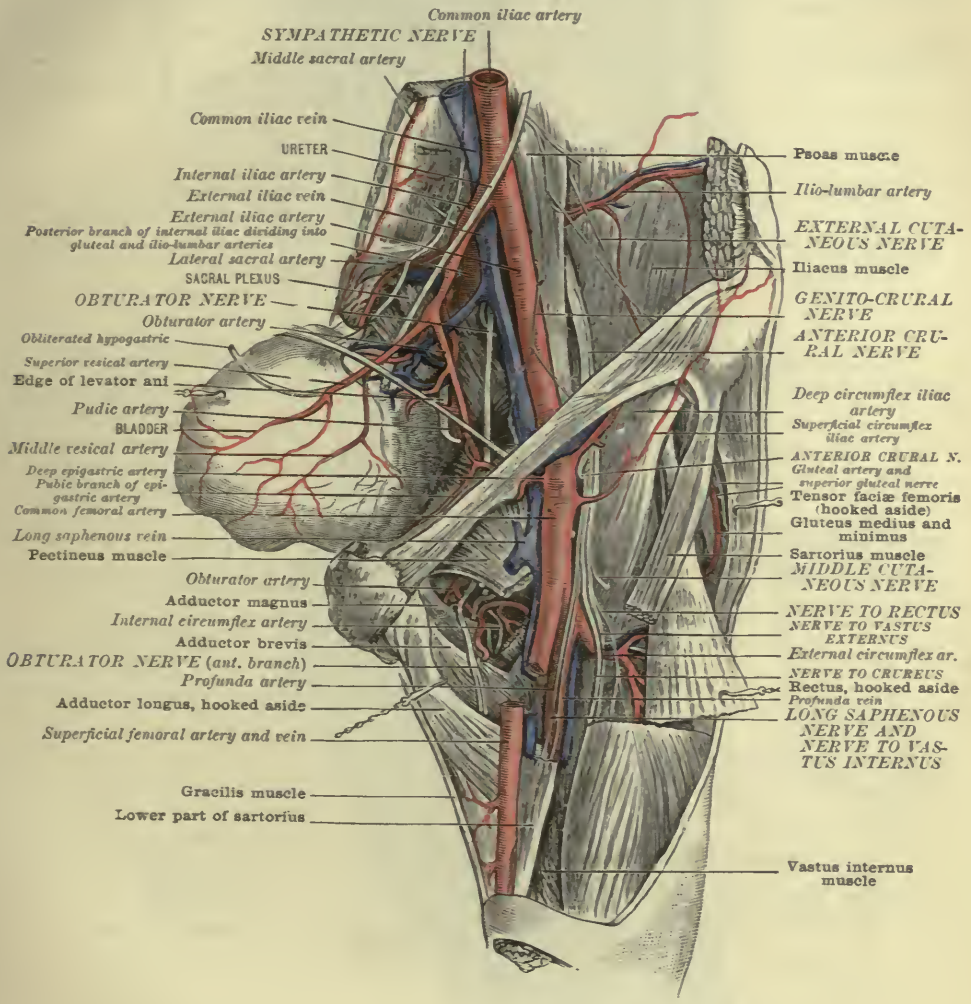
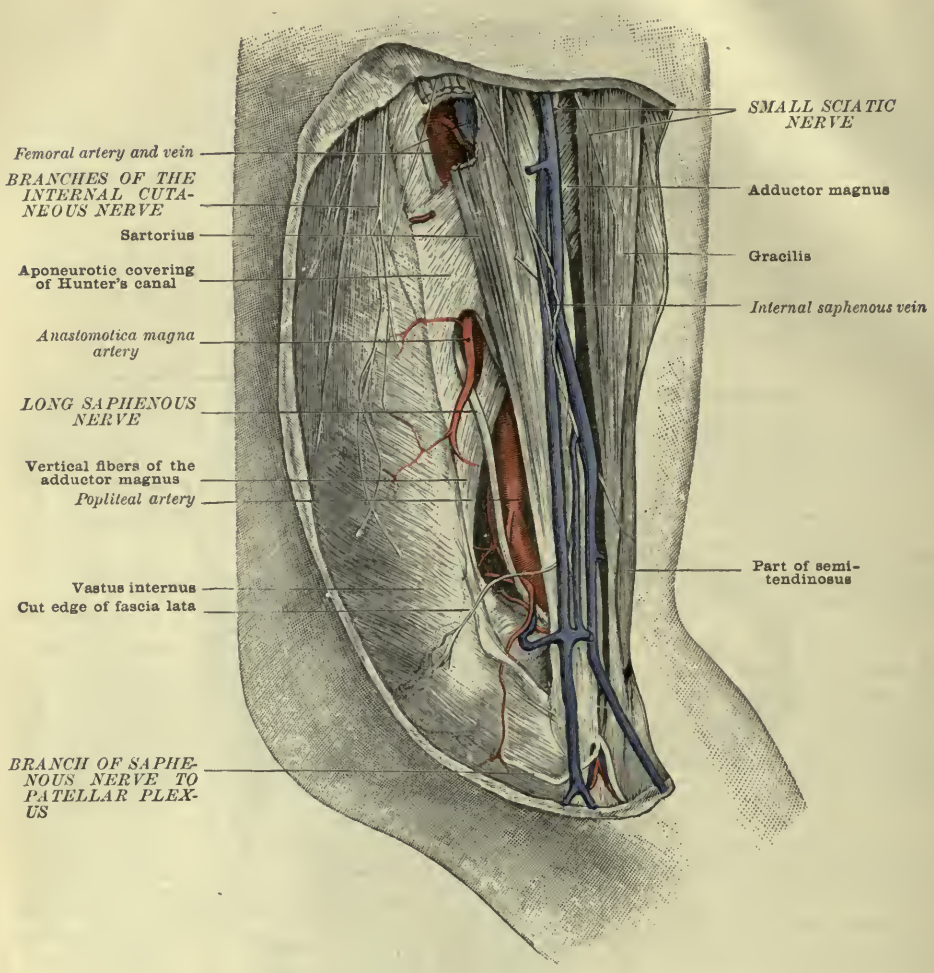


FIG. 258.—SIDE VIEW OF THE RIGHT POPLITEAL ARTERY.—(*Morris.*)
(From a dissection in the Hunterian Museum.)



Observe Hunter's canal.

Veins:—

Femoral and tributaries.

Study the deep and superficial lymphatics.

INTERNAL FEMORAL REGION.

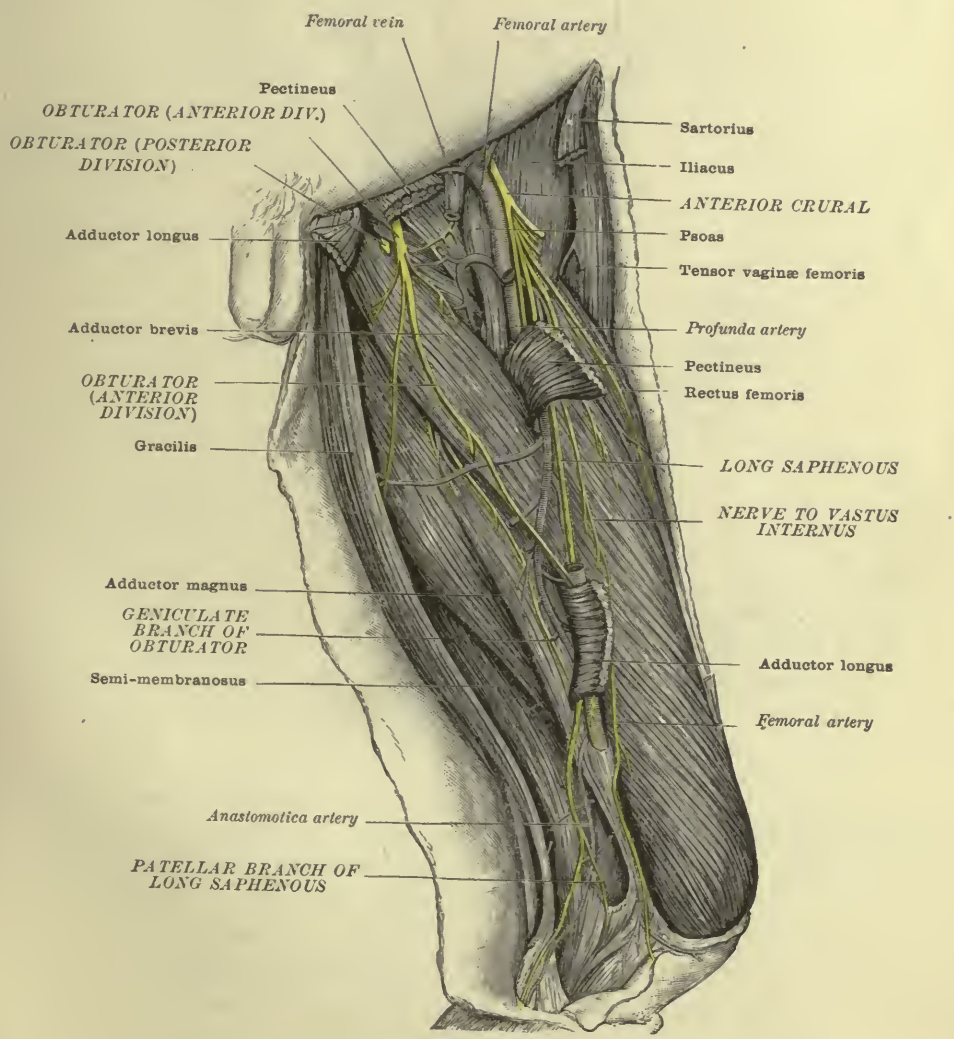
Dissection.—Remove the skin from the internal femoral region; turn it inward, exposing the superficial fascia and nerves.

Expose the following:—

Muscles (see Figs. 256, 257):—

Gracilis.
Pectineus.
Adductor longus.
Adductor magnus.
Adductor brevis.
Iliacus.
Psoas.

FIG. 259.—ANTERIOR CRURAL AND OBTURATOR NERVES. (Ellis.) (*Morris.*)
Also see Fig. 256.



Arteries:—Trace the following:—

Femoral:—

Profunda femoris.

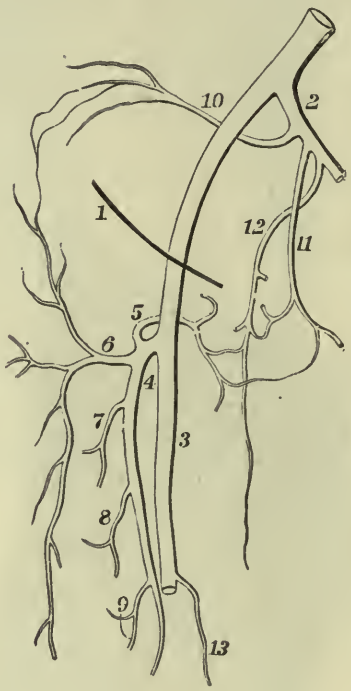
Branches.

Muscular.

Anastomotica magna.

Obturator.

FIG. 260.—PLAN OF THE INOSCULATIONS OF THE CIRCUMFLEX ARTERIES.—(*Holden.*)
1. Crural Arch. 2. Internal iliac. 3. Superficial femoral. 4. Profunda. 5. Internal circumflex. 6. External circumflex. 7. First perforating. 8. Second ditto. 9. Third ditto. 10. Gluteal. 11. Obturator. 12. Sciatic. 13. Anastomotica magna.



Nerves:—

Obturator.

Accessory obturator.

Anterior crural and branches. (See Fig. 259.)

DEMONSTRATION XIII.

POSTERIOR FEMORAL REGION AND POPLITEAL SPACE.

Popliteal space.

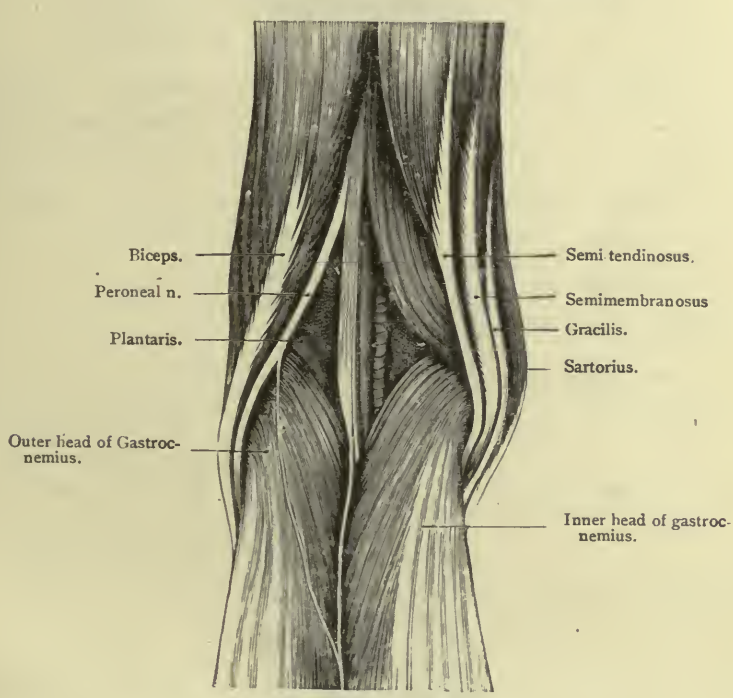
The superficial structures of the popliteal space should be dissected first so as to see the relative position of the parts.

Dissection.—Make two transverse incisions, one three inches above and one three inches below the knee-joint, a third incision connecting these two in the median line. Turn the skin outward and inward.

Note the superficial fascia, cutaneous branches of small sciatic nerve, internal cutaneous and communicans fibularis and communicans tibialis nerves.

Remove the fascia and clean the tendons of the outer hamstring and inner hamstring, external and internal popliteal nerves, popliteal vein, short saphenous vein, and popliteal artery.

FIG. 261.—LEFT POPLITEAL SPACE.—(*Holden.*)



Posterior femoral region.

Dissection.—Make a median incision along the posterior part of the thigh and turn the skin outward and inward. Note the:—

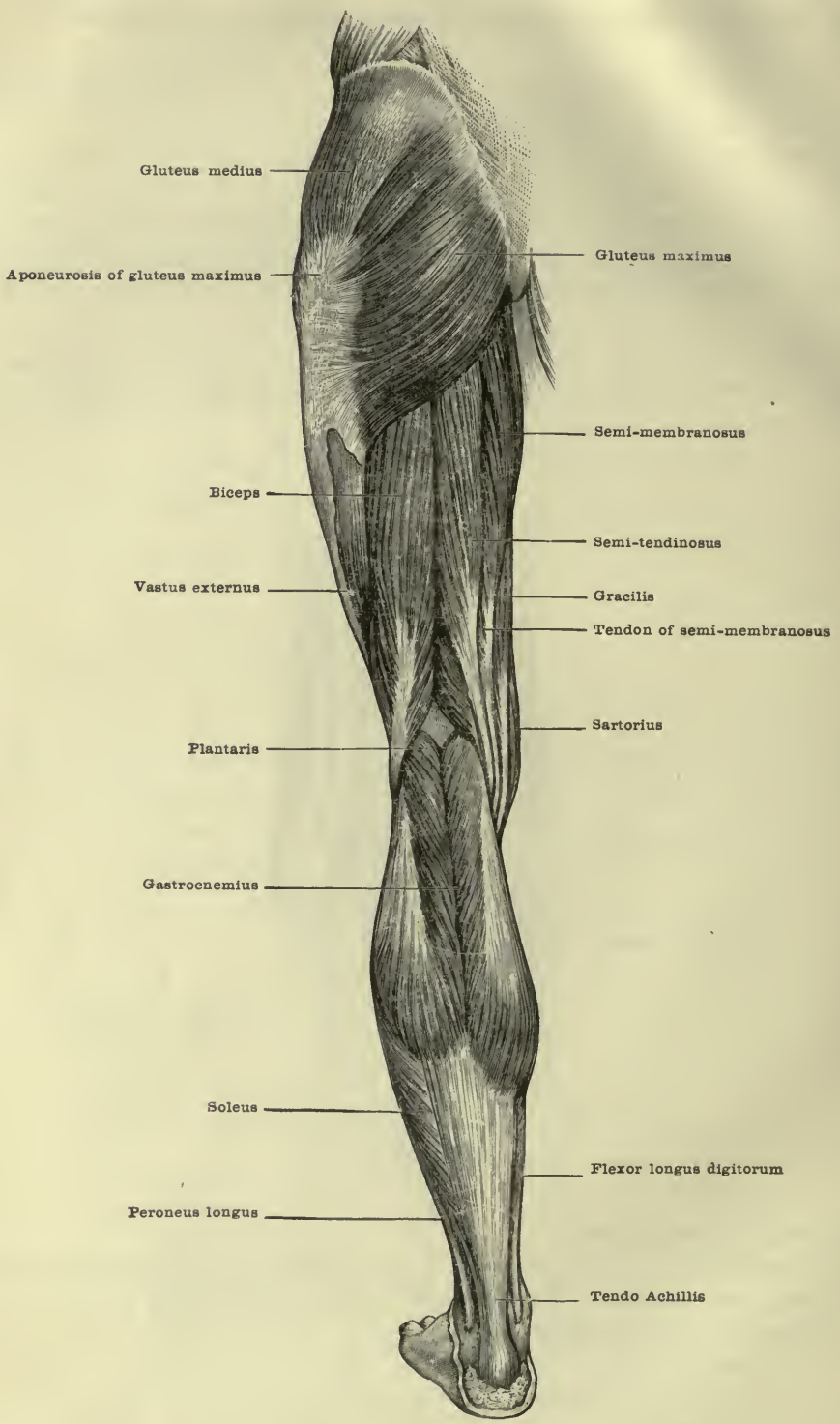
Superficial nerves (Fig. 242).

Small sciatic.

External cutaneous.

Obturator.

FIG. 262.—SUPERFICIAL MUSCLES OF THE BACK OF THE THIGH AND LEG.—(*Morris.*)



Muscles (Fig. 262):—
- Biceps,
- Semitendinosus.
- Semimembranosus.

Arteries:
- Branches of the profunda.
- Sciatic.

Nerves:—Deep branches.
- Great sciatic (*n. ischiadicus*).
- Small sciatic (*n. cutaneus posterior*).
- Obturator.

Deep parts of the popliteal space.

Nerves (see Fig. 263):—
- External popliteal.
- Internal popliteal.
- Obturator, articular branch.

Arteries:—
- Popliteal and branches.
- Anastomosis about the knee-joint.

Veins:—
- Popliteal and tributaries.

FIG. 263.—DEEP VIEW OF THE POPLITEAL SPACE. (Hirschfeld and Leveillé.) (*Morris.*)

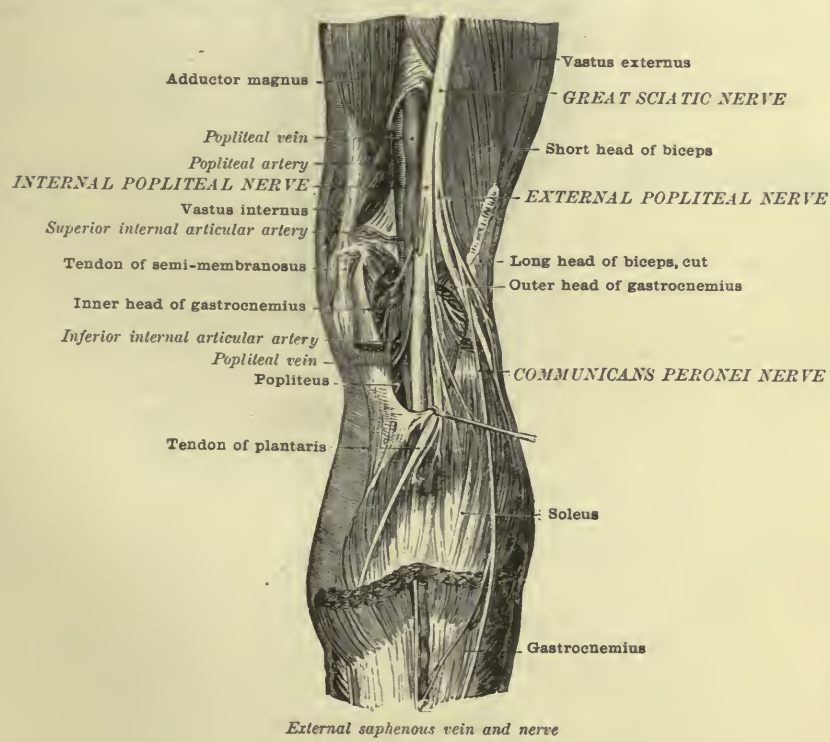
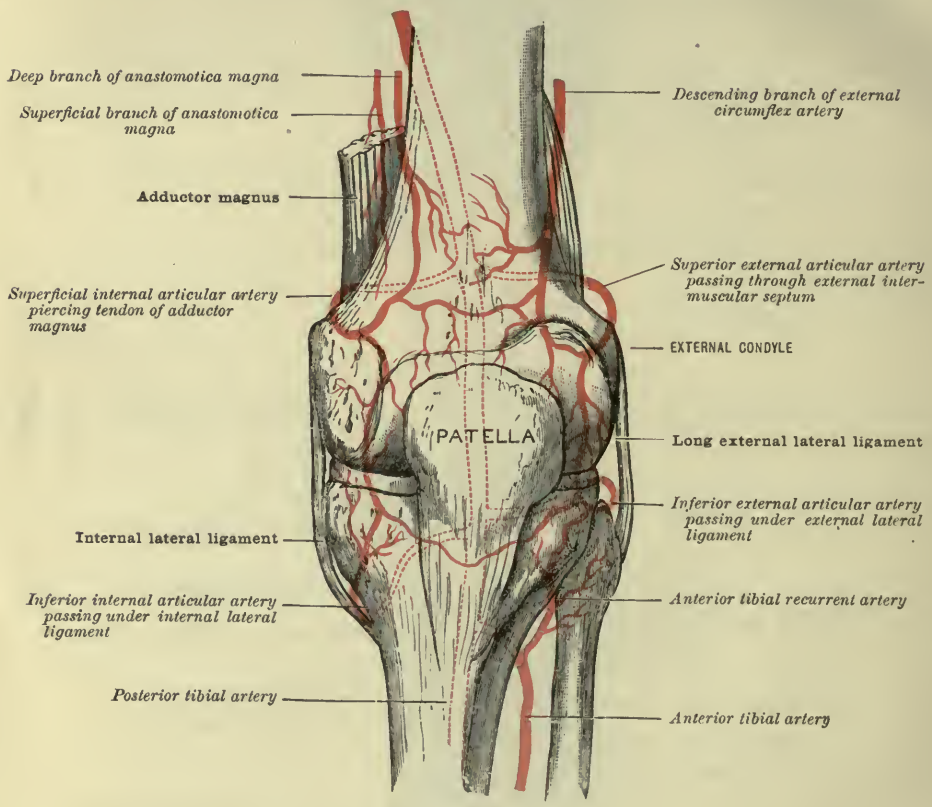


FIG. 264.—THE ANASTOMOSIS ABOUT THE LEFT KNEE-JOINT. (Walsham.) (*Morris.*)
(Semi-diagrammatic.)


Deep branch of anastomotica magna
Superficial branch of anastomotica magna
Adductor magnus
Superficial internal articular artery piercing tendon of adductor magnus
Internal lateral ligament
Inferior internal articular artery passing under internal lateral ligament
Posterior tibial artery
Descending branch of external circumflex artery
Superior external articular artery passing through external intermuscular septum
EXTERNAL CONDYLE
PATELLA
Long external lateral ligament
Inferior external articular artery passing under external lateral ligament
Anterior tibial recurrent artery
Anterior tibial artery

DEMONSTRATION XIV.

ANTERIOR TIBIO-FIBULAR REGION.

Examine the osseous parts of the leg, and knee- and ankle-joints on the articulated skeleton.

Dissection.—Make an incision down the anterior median line of the leg and dorsum of the foot to the toes, a transverse incision just back of the metatarso-phalangeal articulation. Turn the skin outward and inward. Make a longitudinal incision along the dorsum of each toe and turn the skin off.

In removing the skin from the anterior part of the leg care must be used not to destroy the **musculo-cutaneous, internal** or **long saphenous,** and **external saphenous nerves.** (See Fig. 242.)

Note and study the fascia of the leg.

Clean and study the annular ligament (Fig. 266).

Nerves:—Trace out the:—

- Long, or internal saphenous.
- External saphenous. (See Fig. 265.)
- External popliteal.
  - Musculo-cutaneous (*N. peronæus superficialis*). (See Fig. 267.)
  - Anterior tibial (*N. peronæus profundus*). (See Fig. 267.)

Expose and study:—

Muscles (see Fig. 263):—

- Tibialis anticus.
- Extensor proprius hallucis (*M. extensor hallucis longus*).
- Extensor longus digitorum.
- Peroneus tertius.
- Extensor brevis digitorum.
- Dorsal interossei.

Arteries:—Expose and note relations:—

- Anterior tibial (Figs. 267, 268).
  - Posterior tibial recurrent.
  - Superior fibular.
  - Anterior tibial recurrent.
  - Muscular.
  - Internal malleolar.
  - External malleolar.
- Dorsalis pedis,—continuation of anterior tibial.
  - Tarsal.
  - Metatarsal (*A. arcuata*) and branches.
  - Dorsalis hallucis.
  - Communicating or plantar digital.

Muscles on fibular side:

- Peroneus longus.
- Peroneus brevis. (See Fig. 266.)

FIG. 265.—PERONEAL, EXTERNAL, OR LATERAL POPLITEAL NERVE.—(*Holden.*)

1. External popliteal or peroneal. 2. Cutaneous branch. 3. Communicans peronei. 4. External saphena. 5. Trunk formed by the union of the external saphena with the accessory of the cutaneous. 6. Calcanean branch. 7. Terminal branch going to 5th toe. 8. Terminal branch to 4th and 5th toes. 9, 9. Musculo-cutaneous. 10, 10. Its terminal branches. 11. Anastomosis of the musculo-cutaneous with the external saphena. 12. Anastomosis of the internal and external or lateral branches of the musculo-cutaneous. 13. Anterior tibial. 14. Terminal branch of anterior tibial, supplying deeper structure great and index toes and anastomosing with the musculo-cutaneous.

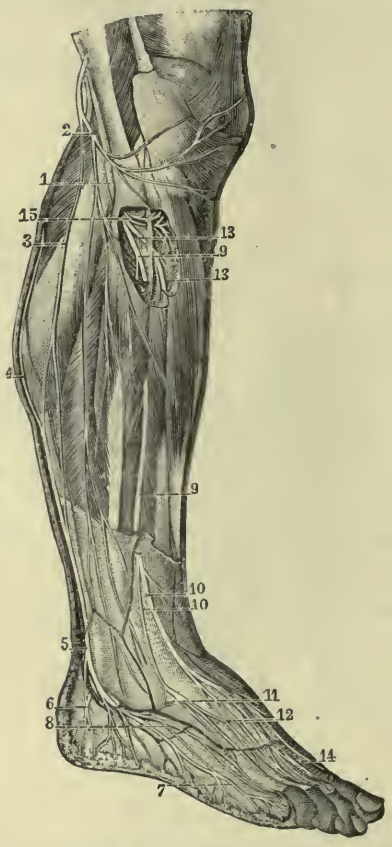


FIG. 266.—THE MUSCLES OF THE FRONT OF THE LEG.—(*Morris.*)

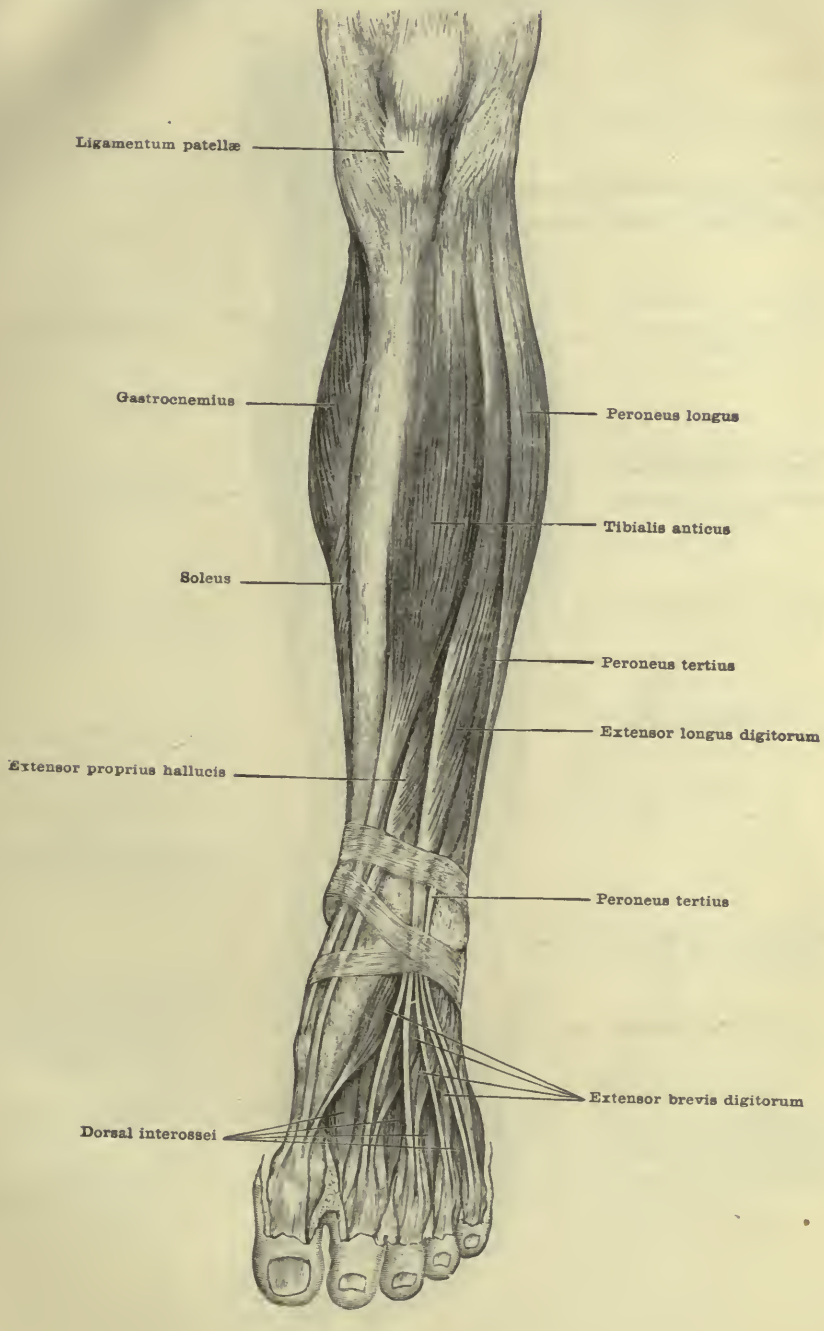


FIG. 267.—BRANCHES OF THE EXTERNAL POPLITEAL NERVE.—(*Morris.*)
Also see Figs. 248 and 265.

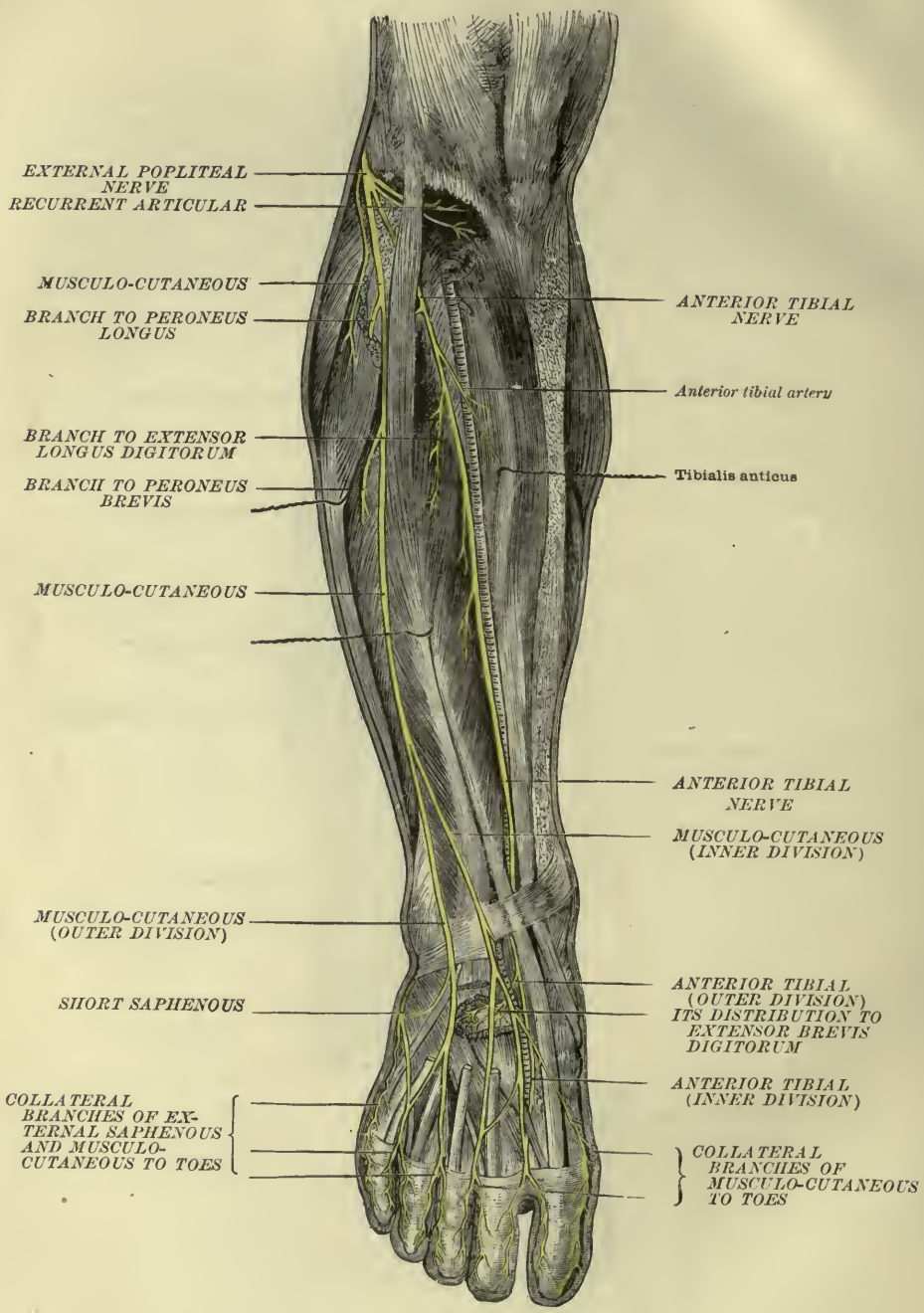


FIG. 268.—THE ANTERIOR TIBIAL ARTERY, DORSAL ARTERY OF THE FOOT, AND ANTERIOR PERONEAL ARTERY, AND THEIR BRANCHES, LEFT SIDE.—(*Morris.*)

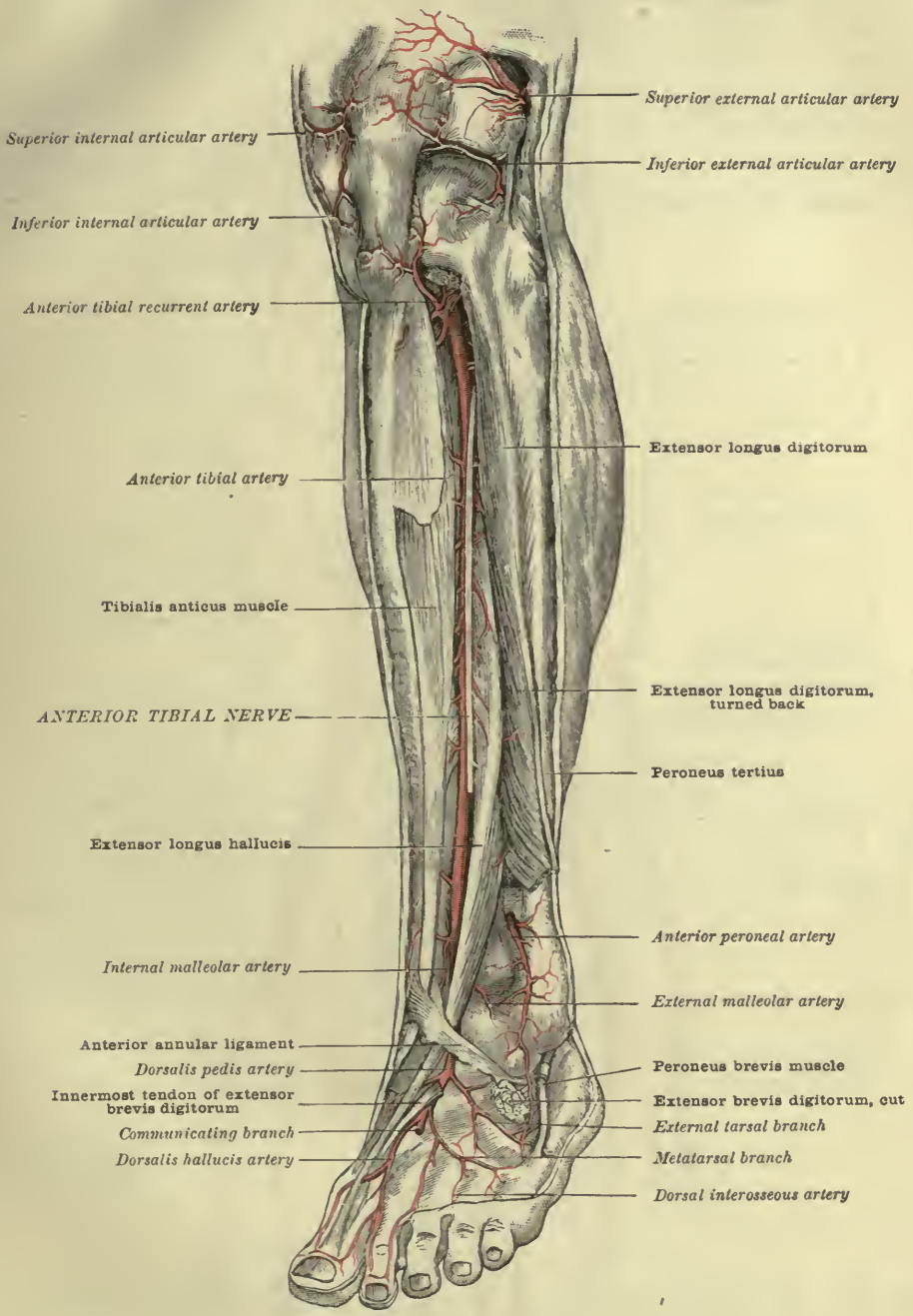
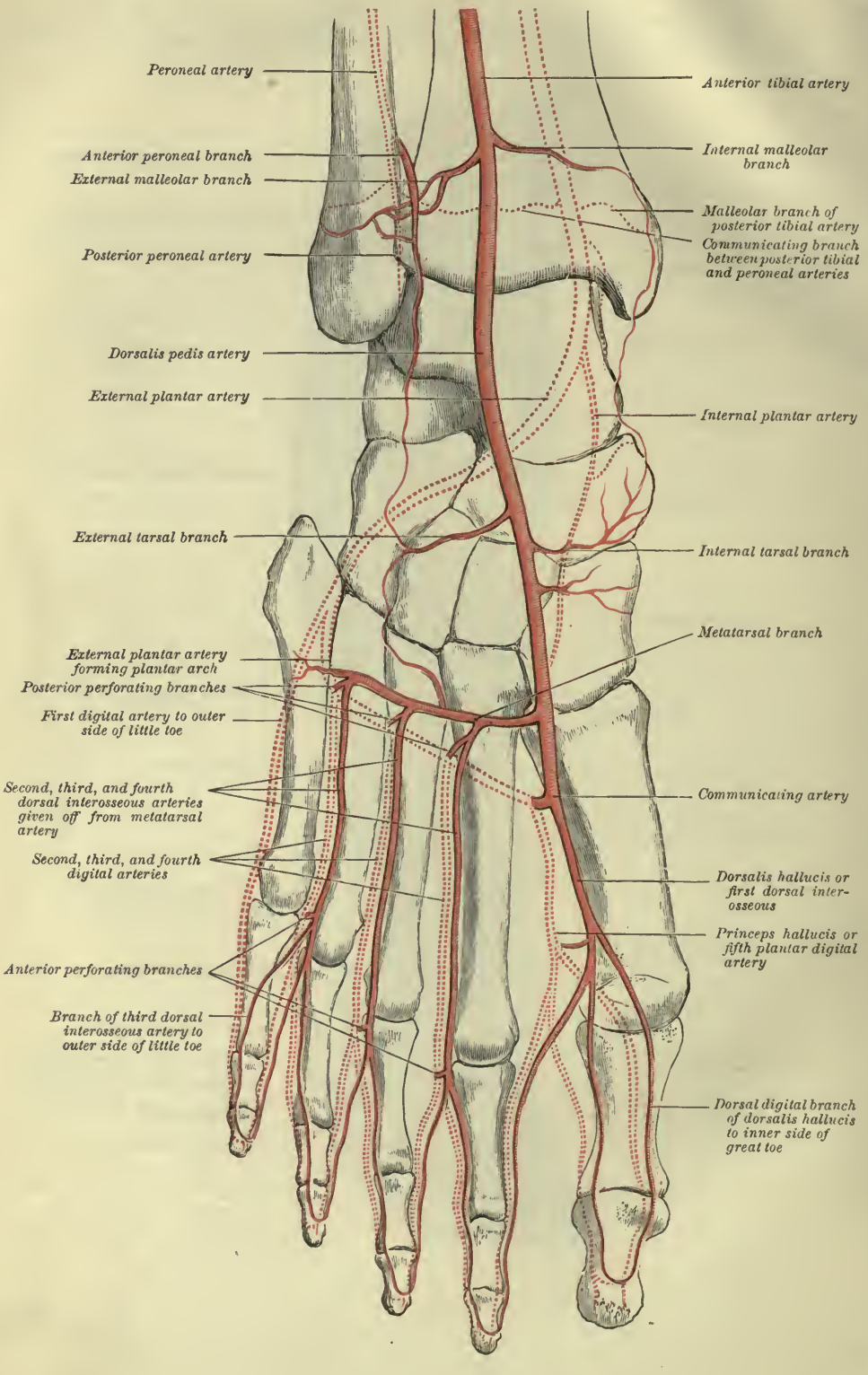


FIG. 269.—SCHEME OF THE DISTRIBUTION AND ANASTOMOSIS OF THE ARTERIES OF THE RIGHT FOOT. (Walsham.) (*Morris.*)
(The plantar arteries are shown in dotted outline; the dorsal in solid red.)


Peroneal artery
Anterior tibial artery
Anterior peroneal branch
External malleolar branch
Internal malleolar branch
Malleolar branch of posterior tibial artery
Posterior peroneal artery
Communicating branch between posterior tibial and peroneal arteries
Dorsalis pedis artery
External plantar artery
Internal plantar artery
External tarsal branch
Internal tarsal branch
Metatarsal branch
External plantar artery forming plantar arch
Posterior perforating branches
First digital artery to outer side of little toe
Second, third, and fourth dorsal interosseous arteries given off from metatarsal artery
Communicating artery
Second, third, and fourth digital arteries
Dorsalis hallucis or first dorsal interosseous
Princeps hallucis or fifth plantar digital artery
Anterior perforating branches
Branch of third dorsal interosseous artery to outer side of little toe
Dorsal digital branch of dorsalis hallucis to inner side of great toe

DEMONSTRATION XV.

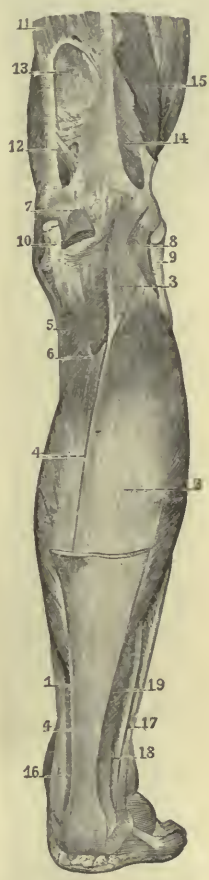
POSTERIOR TIBIO-FIBULAR REGION.

Dissection.—Remove the skin from the posterior tibial region with care so as not to destroy the communicans fibularis and tibialis forming the external saphenous nerve. (See Fig. 242.) Note external saphenous vein.

When the above superficial nerves and vein in the superficial fascia have been traced and studied, clean and study the **gastrocnemius** muscle; then cut its two heads near their origins and turn it down; do not remove it.

Observe the **plantaris muscle.**

FIG. 270.—MUSCLES OF THE CALF.—(*Holden.*)

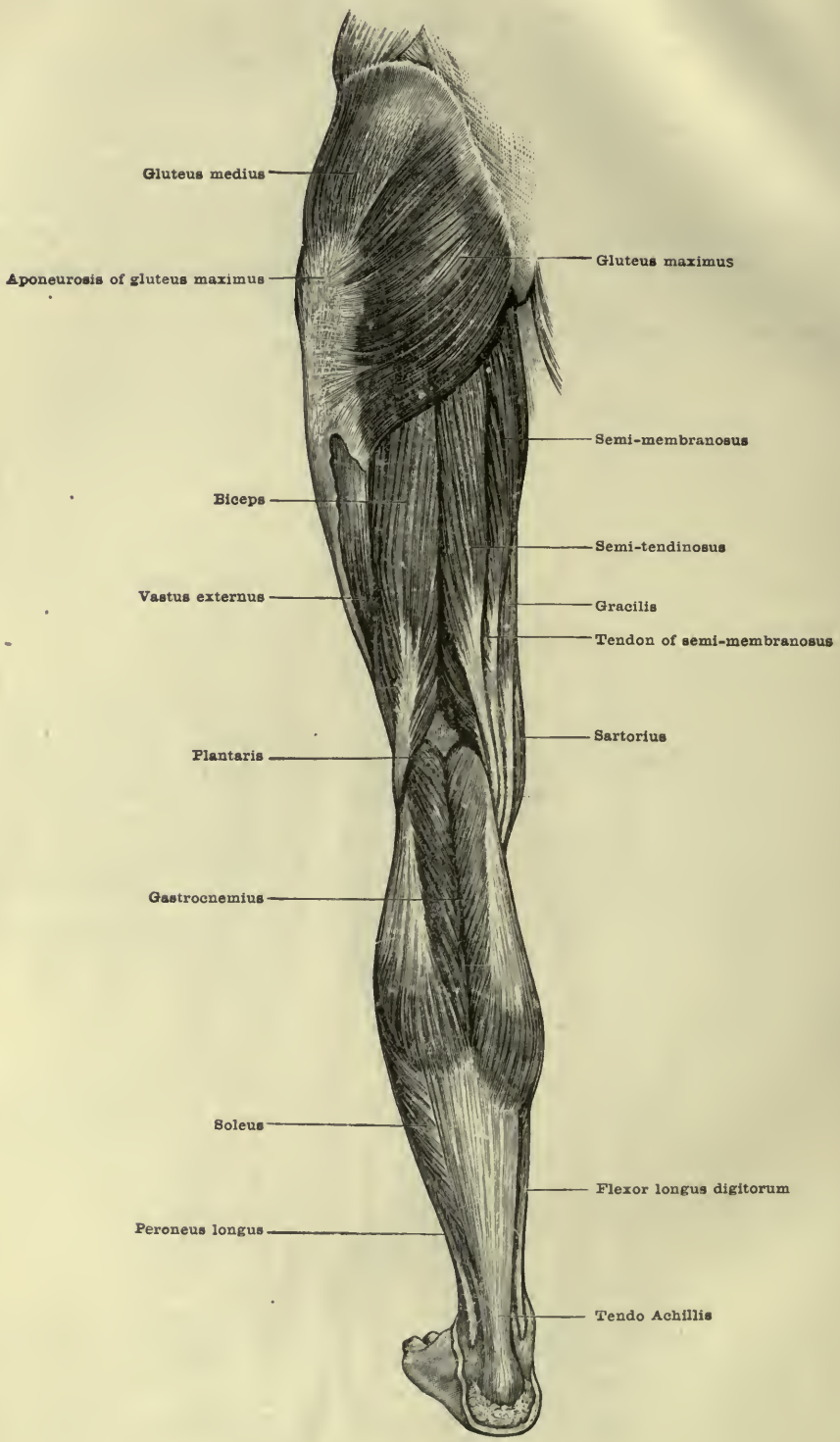


1. Tendo Achillis.
2. Soleus.
3. Plantaris.
4. Its tendons.
5. Popliteus.
6. Annular fibres of the soleus.
7. Origin of the inner head of the gastrocnemius.
8. Same of the outer head.
9. Tendon of the biceps.
10. Tendon of the semi-membranosus.
11. Adductor magnus.
12. Its tendon.
13. Lower opening of Hunter's canal.
14. External intermuscular septum.
15. Vastus externus.
16. Tendon of the flexor longus digitorum.
17. Tendon of the peroneus longus.
18. Tendon of the peroneus brevis.
19. Flexor longus hallucis.

Study the **soleus muscle.** Then cut it at its origin and the tendon of the plantaris and turn them down.

In cutting the origin of the soleus do not destroy any of the structures below.

FIG. 271.—SUPERFICIAL MUSCLES OF THE BACK OF THE THIGH AND LEG.—(*Morris.*)

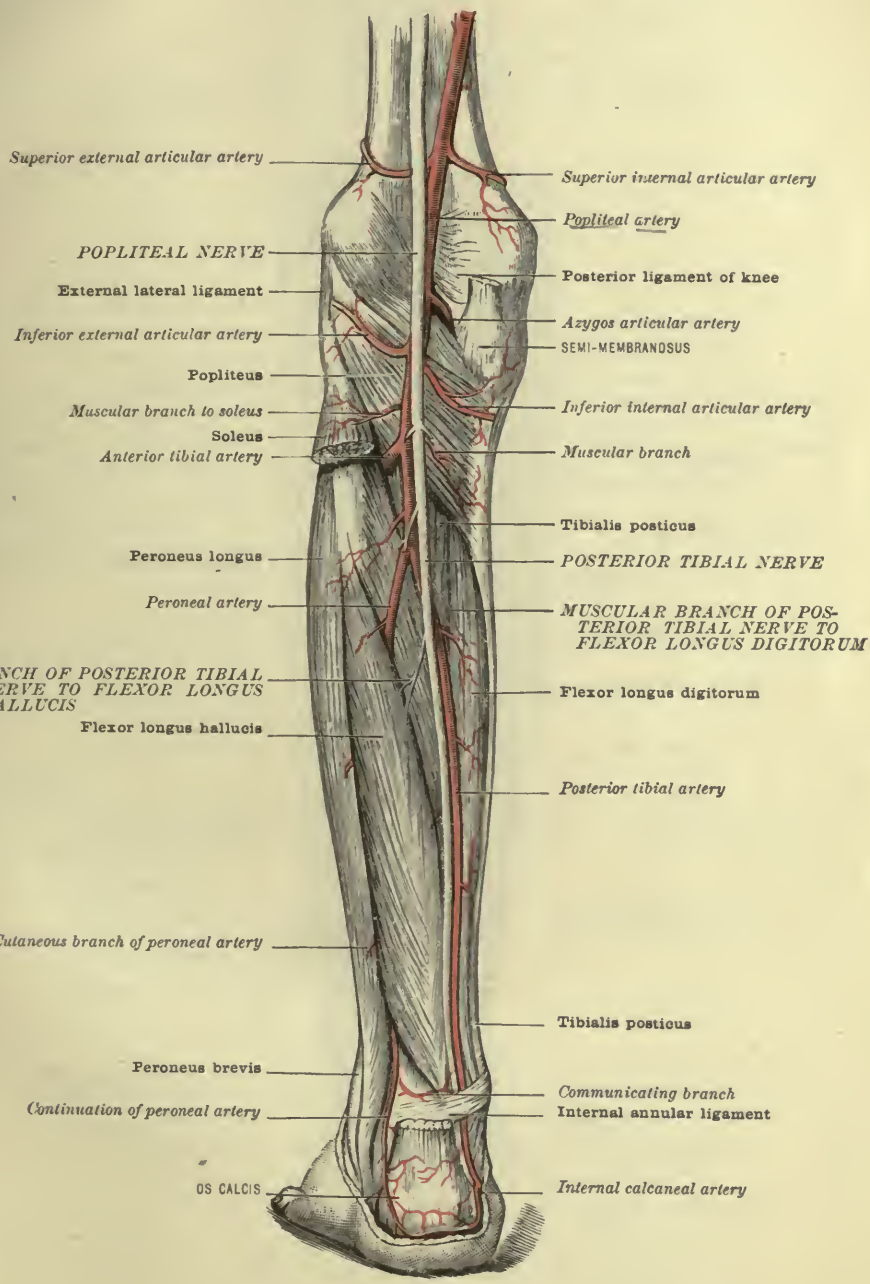


Note the **tendo Achillis** (*tendo calcaneus*),—its formation and insertion. Turn the tendo Achillis down to its insertion, with the gastrocnemius, soleus, and tendon of plantaris attached, but do not remove them.

Note the deep tibial fascia and internal annular ligament.

Trace down the posterior **tibial artery** and **nerve,** observing their relation to each other and to the surrounding muscles.

FIG. 272.—RELATIONS OF THE POPLITEAL ARTERY TO BONES AND MUSCLES, LEFT SIDE.—(*Morris.*)



Study the arteries, muscles, and nerves:—

Arteries:—

Posterior tibial
- Peroneal
- Muscular.
- Medullary.
- Cutaneous
- Communicating.
- Malleolar
- Calcanean

FIG. 273.—THE POPLITEAL, THE POSTERIOR TIBIAL, AND THE PERONEAL ARTERY, RIGHT SIDE.—(*Morris.*)

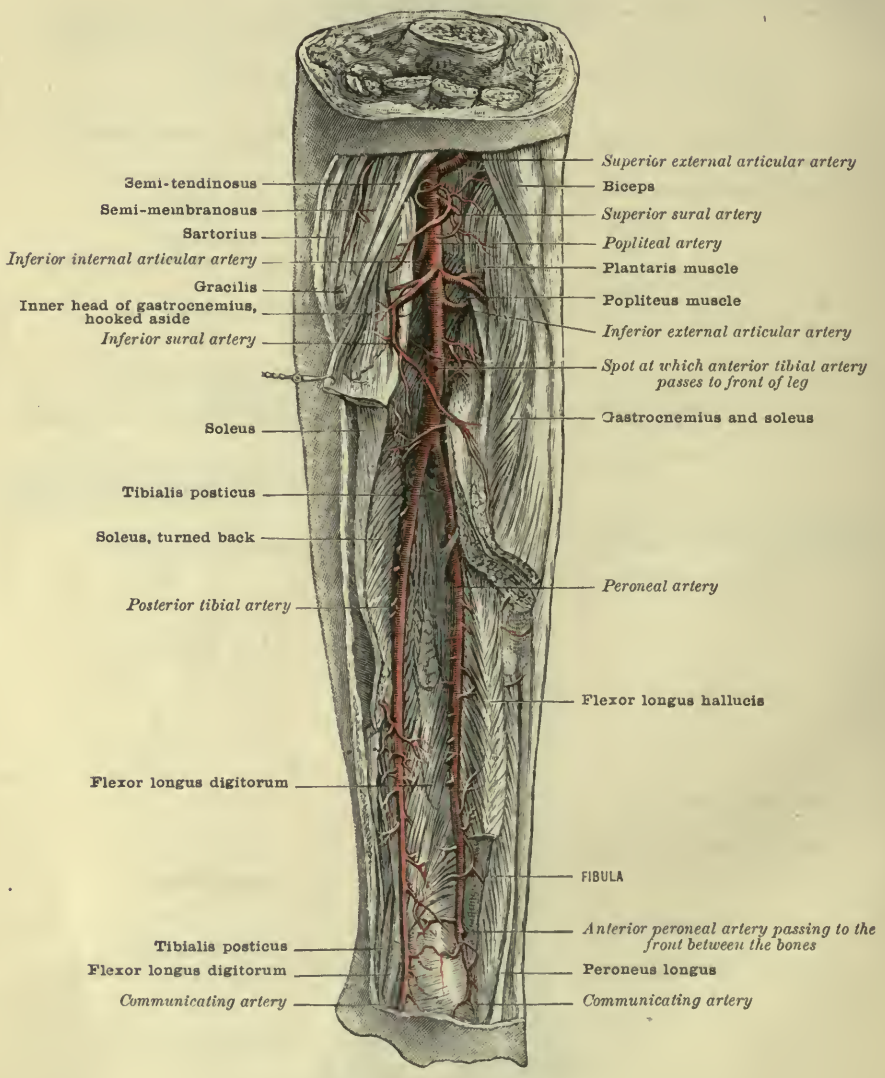
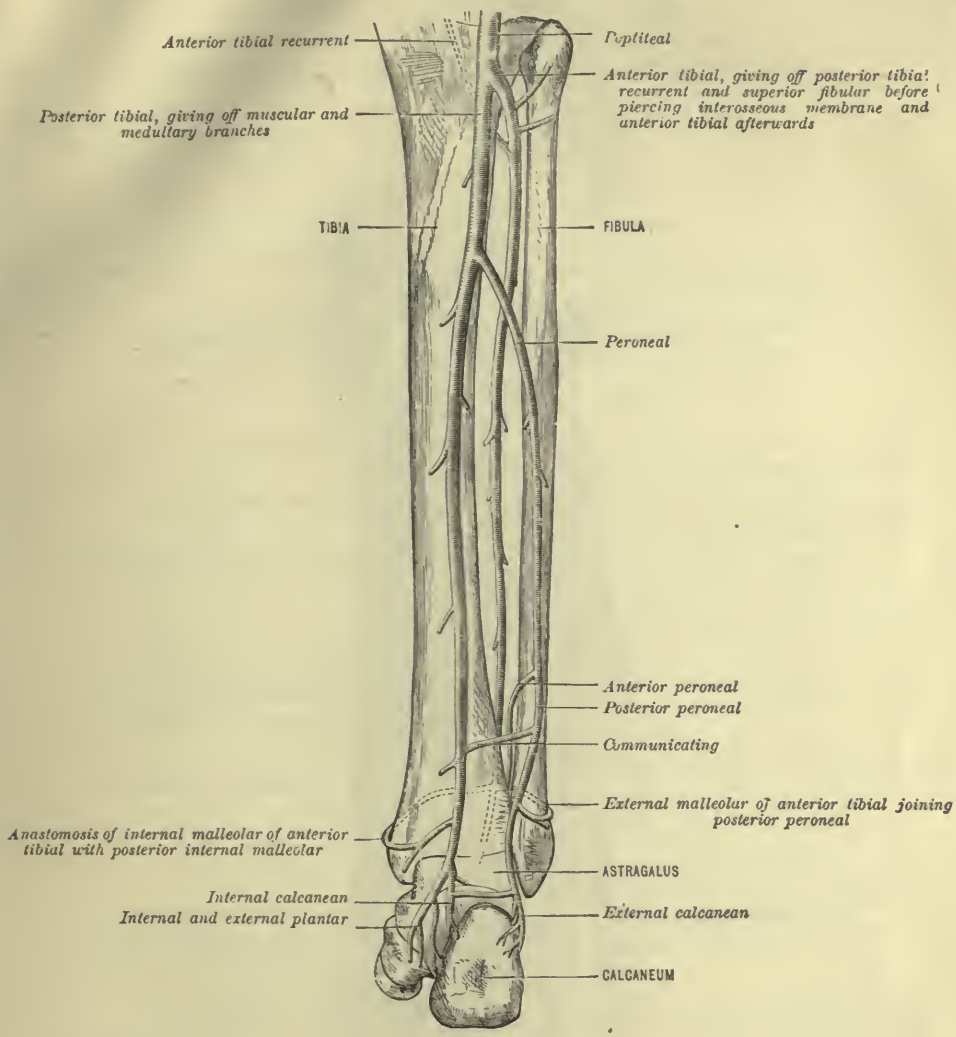


FIG. 274.—ANASTOMOSES OF TIBIAL ARTERIES.—(*Morris.*) (Also see Fig. 272)



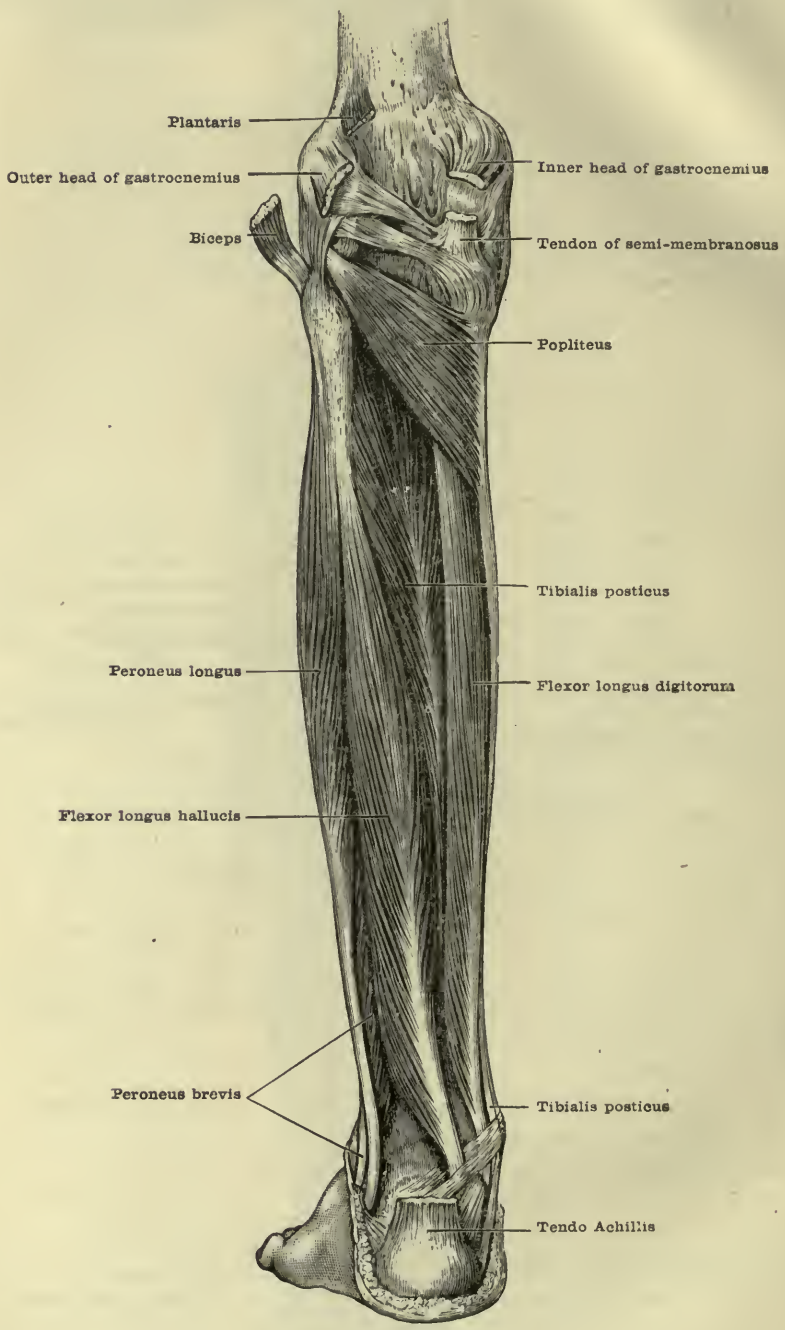
Nerves:—

Posterior tibial (*n. tibialis*) and branches. (See Fig. 272.)

Muscles:—

Popliteus.
Flexor longus hallucis.
Flexor longus digitorum.
Tibialis posticus.

FIG. 275.—THE DEEP MUSCLES OF THE BACK OF THE LEG.—(*Morris.*)



PLANTAR REGION OF THE FOOT.

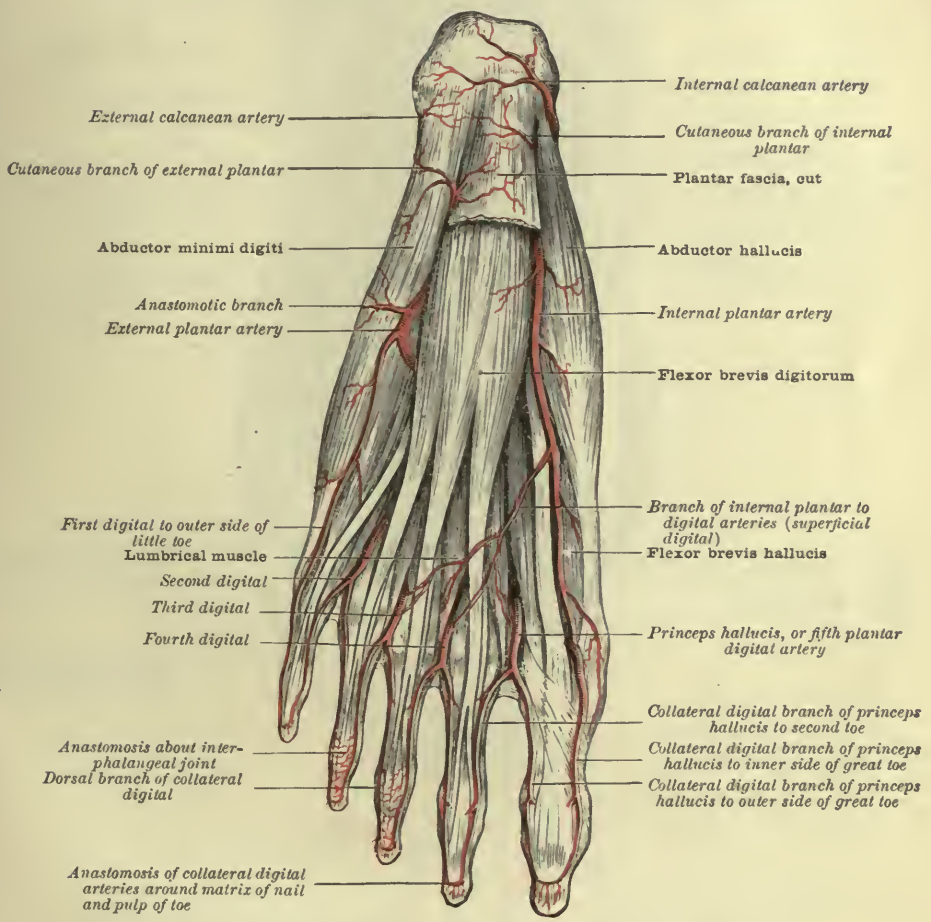
Remove the skin from the plantar surface of the foot and toes.

Note the plantar fascia,—position and density, describe it. Cut it near the heel and turn it forward, exposing the first layer of muscles of the sole of the foot and branches of arteries and nerves.

Muscles,—First layer.

Flexor brevis digitorum pedis.
Abductor hallucis.
Abductor minimi digiti pedis.

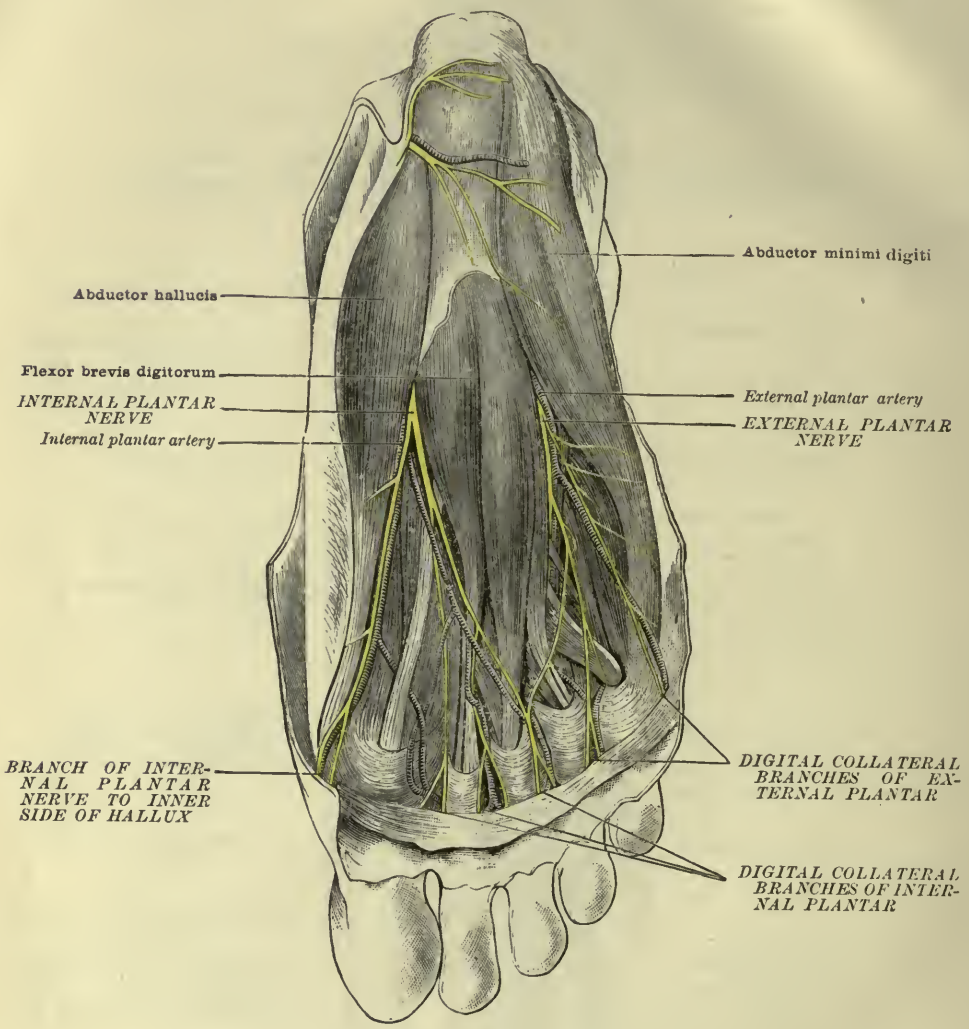
FIG. 276.—THE PLANTAR ARTERIES, LEFT FOOT.—(*Morris.*)
(From a dissection in the Museum of St. Bartholomew's Hospital.)


Internal calcanean artery
External calcanean artery
Cutaneous branch of internal plantar
Cutaneous branch of external plantar
Plantar fascia, cut
Abductor minimi digiti
Abductor hallucis
Anastomotic branch
External plantar artery
Internal plantar artery
Flexor brevis digitorum
Branch of internal plantar to digital arteries (superficial digital)
First digital to outer side of little toe
Lumbrical muscle
Flexor brevis hallucis
Second digital
Third digital
Fourth digital
Princeps hallucis, or fifth plantar digital artery
Collateral digital branch of princeps hallucis to second toe
Anastomosis about interphalangeal joint
Dorsal branch of collateral digital
Collateral digital branch of princeps hallucis to inner side of great toe
Collateral digital branch of princeps hallucis to outer side of great toe
Anastomosis of collateral digital arteries around matrix of nail and pulp of toe

Nerves:—

Internal plantar (*n. plantaris medialis*) and branches.
External plantar (*n. plantaris lateralis*) and branches.

FIG. 277.—SUPERFICIAL NERVES IN THE SOLE OF THE FOOT. (Ellis.) (*Morris.*)


Abductor minimi digiti
Abductor hallucis
Flexor brevis digitorum
INTERNAL PLANTAR NERVE
Internal plantar artery
External plantar artery
EXTERNAL PLANTAR NERVE
BRANCH OF INTERNAL PLANTAR NERVE TO INNER SIDE OF HALLUX
DIGITAL COLLATERAL BRANCHES OF EXTERNAL PLANTAR
DIGITAL COLLATERAL BRANCHES OF INTERNAL PLANTAR

Arteries:—

Internal plantar (*a. plantaris medialis*) and branches.
External plantar (*a. plantaris lateralis*) and branches.

Use great care and do not cut the digital branches of nerves and arteries.

Remove the first layer of muscles and expose:—

Arteries:—

Deeper parts of the external and internal plantar and branches.

FIG. 278.—RIGHT PLANTAR ARTERIES (DEEP).—(*Morris.*)
(From a dissection in the Hunterian Museum.)

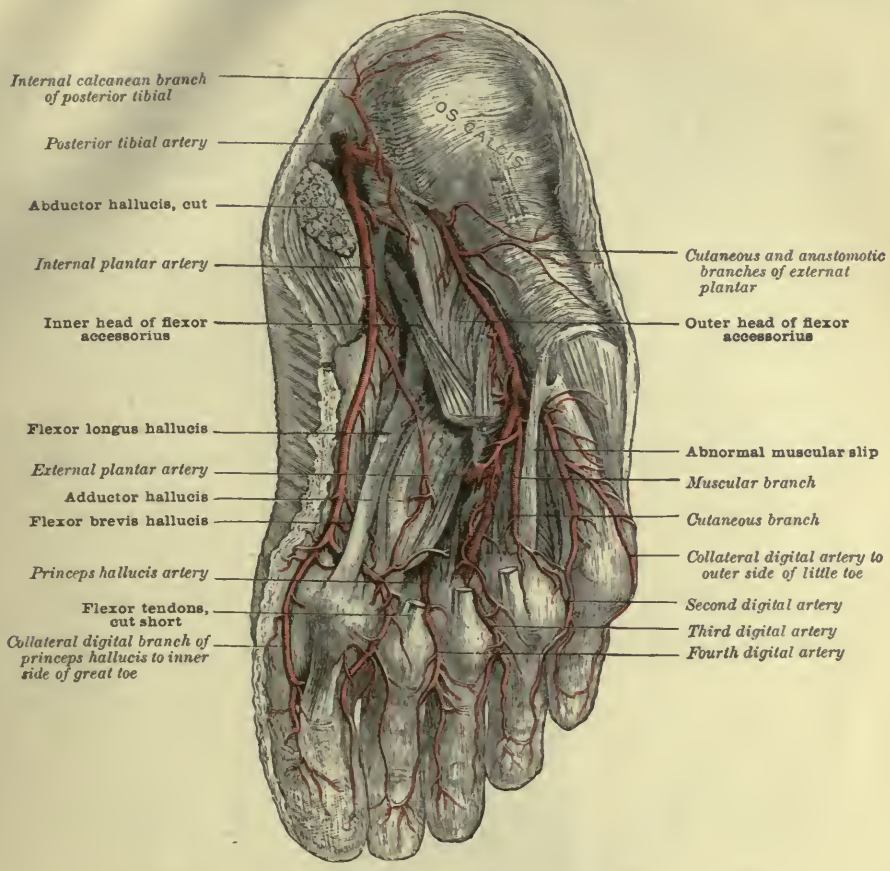
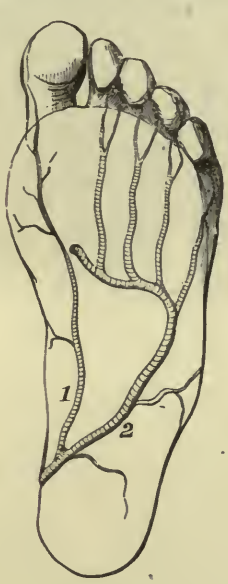

Internal calcanean branch of posterior tibial
Posterior tibial artery
Abductor hallucis, cut
Internal plantar artery
Inner head of flexor accessorius
Flexor longus hallucis
External plantar artery
Adductor hallucis
Flexor brevis hallucis
Princeps hallucis artery
Flexor tendons, cut short
Collateral digital branch of princeps hallucis to inner side of great toe
OS CALCIS
Cutaneous and anastomotic branches of external plantar
Outer head of flexor accessorius
Abnormal muscular slip
Muscular branch
Cutaneous branch
Collateral digital artery to outer side of little toe
Second digital artery
Third digital artery
Fourth digital artery

FIG. 279.—(*Holden.*)
1. Internal plantar artery. 2. External plantar artery.

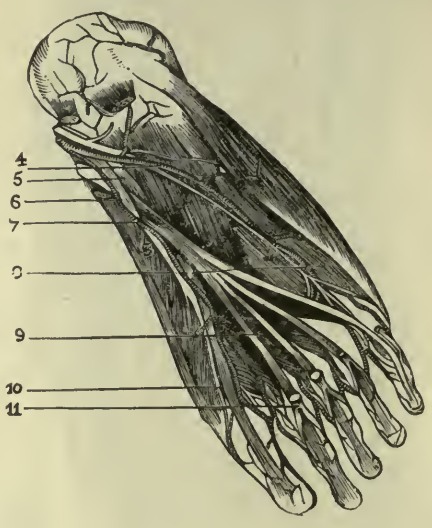


Nerves:—

Deeper parts of internal and external plantar and branches.

FIG. 280.—MUSCLES, VESSELS, AND NERVES OF THE SOLE OF THE RIGHT FOOT, AFTER REFLECTION OF THE FLEXOR BREVIS DIGITORUM.—(*Holden.*)

1. Abductor minimi digiti. 2. Flexor Accessorius. 3. Abductor hallucis. 4. External plantar artery and nerve. 5. Tendon of flexor longus hallucis. 6, 7. Internal plantar artery and nerve. 8. Flexor brevis minimi digiti. 9. Lumbricales. 10. Internal plantar nerve. 11. Tendons of the flexor brevis digitorum bifurcating for the passage of the tendons of the flexor longus digitorum.



Muscles below the first layer of muscles:—

Flexor accessorius.
Lumbricales.
Tendon of flexor longus digitorum.
Tendon of flexor longus hallucis.
Flexor brevis hallucis.
Flexor brevis minimi digiti.
Adductor hallucis.
Transversus pedis.
Plantar interossei.

FIG. 281.—SECOND LAYER OF THE MUSCLES OF THE SOLE.—(*Morris.*)

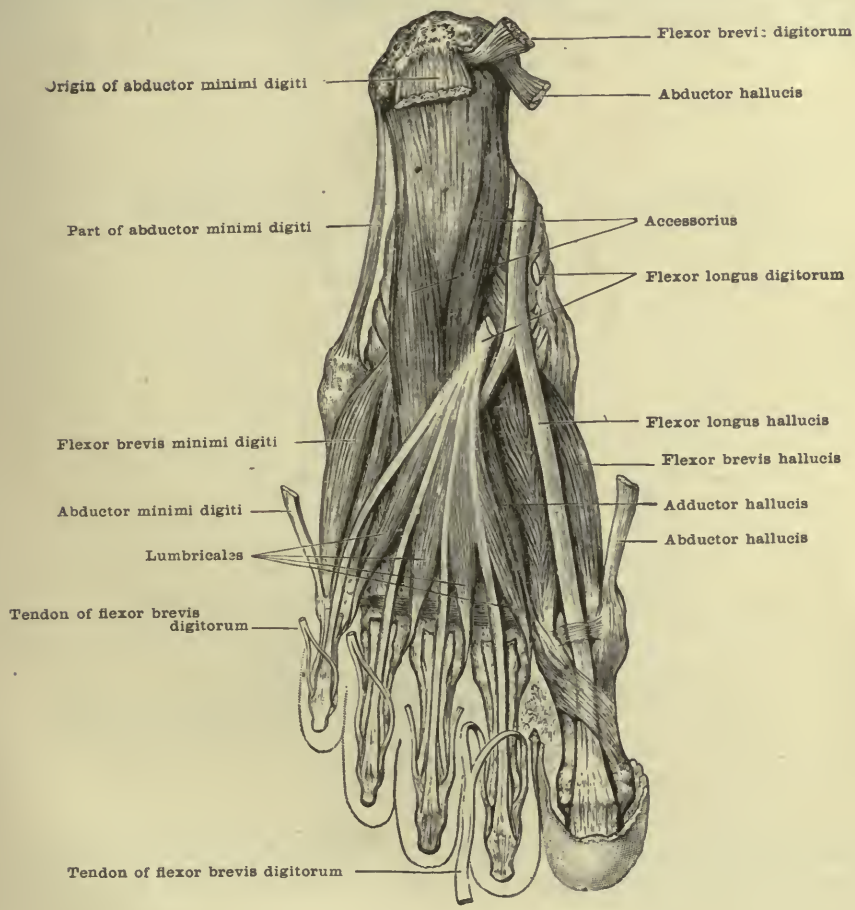
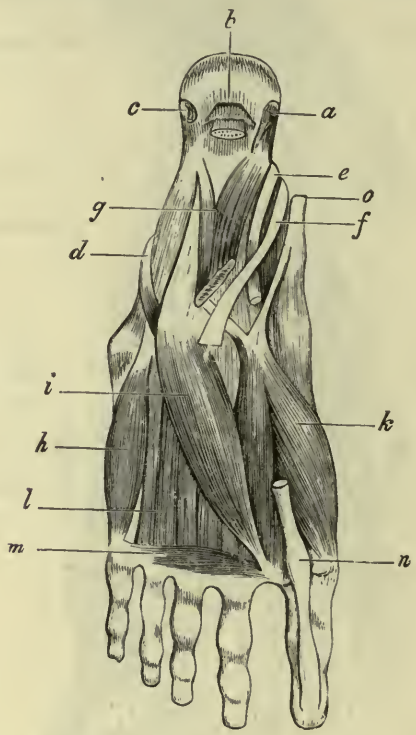


FIG. 282.—VIEW OF THE THIRD LAYER OF MUSCLES OF THE FOOT.—(*Holden.*)

a. Abductor hallucis. *b*. Flexor brevis digitorum. *c*. Abductor minimi digiti. *d*. Tendon of peroneus longus. *e*, *n*. Flexor longus hallucis. *f*. Tendon of flexor longus digitorum. *g*. Flexor accessorius. *h*. Flexor brevis minimi digiti. *i*. Adductor hallucis. *k*. Flexor brevis hallucis. *l*. Interossei. *m*. Transversalis pedis. *o*. Tibialis posticus.



Examine the relations of the structures behind the inner malleolus and above the ankle-joint.

FIG. 283.—RELATIONS OF PARTS BEHIND THE INNER MALLEOLUS. (Heath.) (*Morris.*)

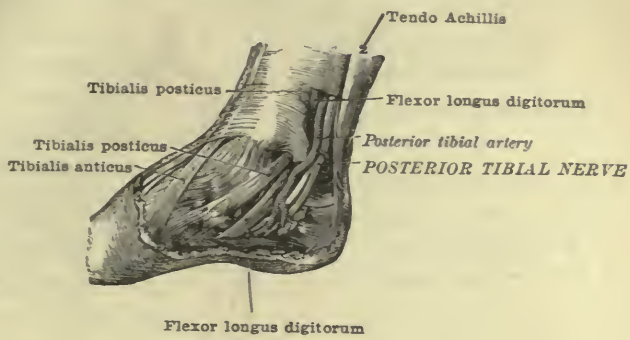
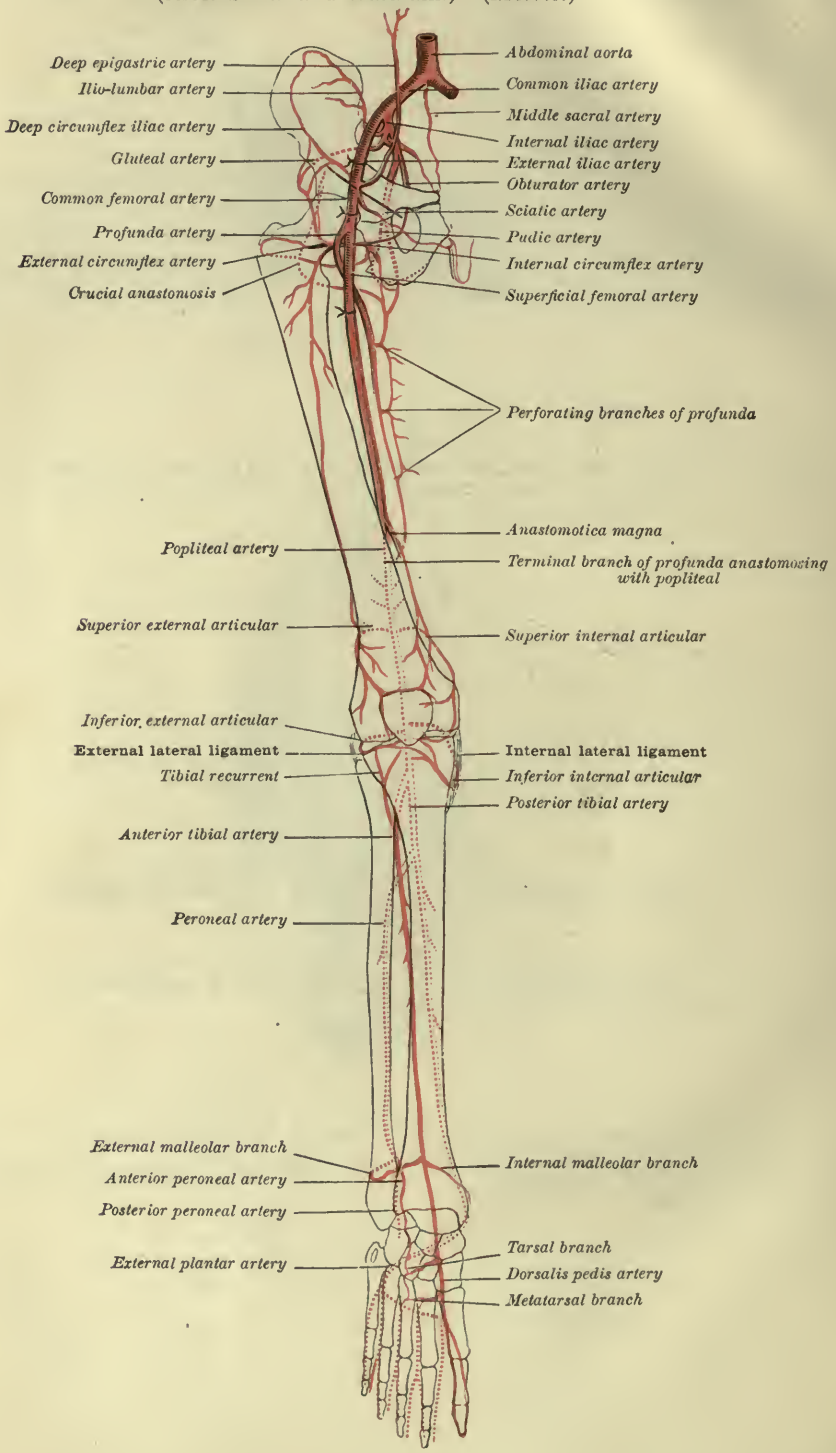


FIG. 284.—TRANSVERSE SECTION THROUGH THE LOWER THIRD OF THE LEFT LEG, IMMEDIATELY ABOVE THE ANKLE-JOINT. (Braune.) (*Morris.*)

When the dissection of the lower extremity is completed place the parts in their proper position and study the relative position each part has to its surroundings.

Examine the anastomoses of the arteries of the lower extremity.

FIG. 285.—TO SHOW THE ANASTOMOSES OF THE ARTERIES OF THE LOWER EXTREMITY. (After Smith and Walsham.) (*Morris.*)



DEMONSTRATION XVI.

ARTICULATIONS AND LIGAMENTS.

Classes of articulations.
Various movements of joints.
Articulation of the pelvis.
- Pelvis with the spine.
- Sacro-iliac.
- Sacro-coccygeal.
- Symphysis of pelvis.

FIG. 286.—ANTERIOR VIEW OF THE LIGAMENTS BETWEEN THE SPINE AND PELVIS.—(*Morris.*)

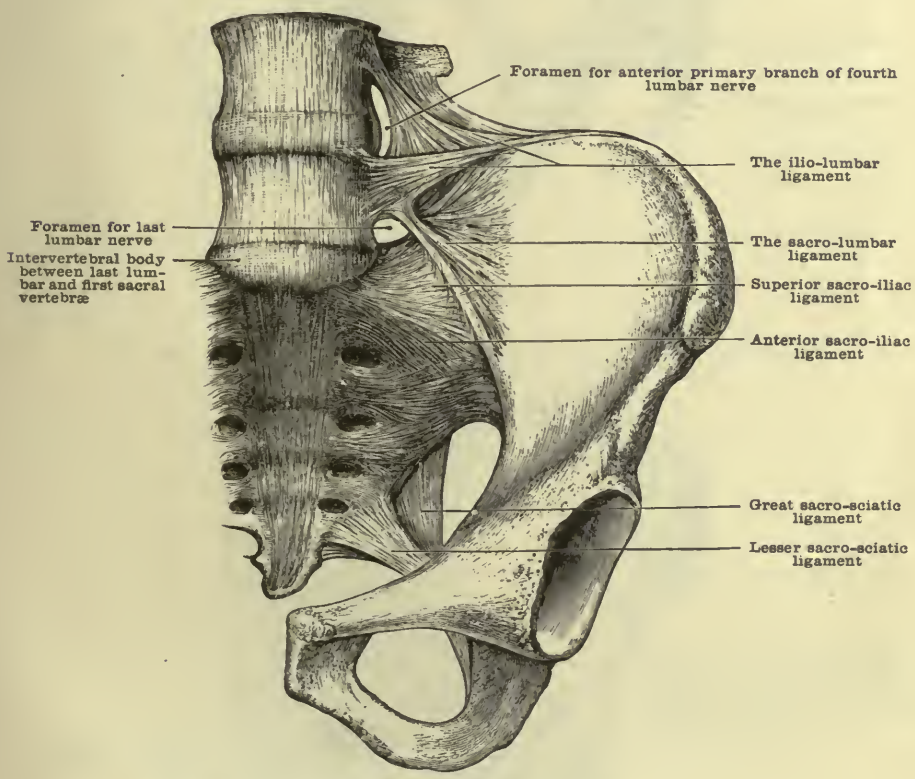

Foramen for anterior primary branch of fourth lumbar nerve
The ilio-lumbar ligament
Foramen for last lumbar nerve
Intervertebral body between last lumbar and first sacral vertebræ
The sacro-lumbar ligament
Superior sacro-iliac ligament
Anterior sacro-iliac ligament
Great sacro-sciatic ligament
Lesser sacro-sciatic ligament

FIG. 287.—VERTICAL ANTERO-POSTERIOR SECTION OF THE PELVIS.—(*Morris.*)

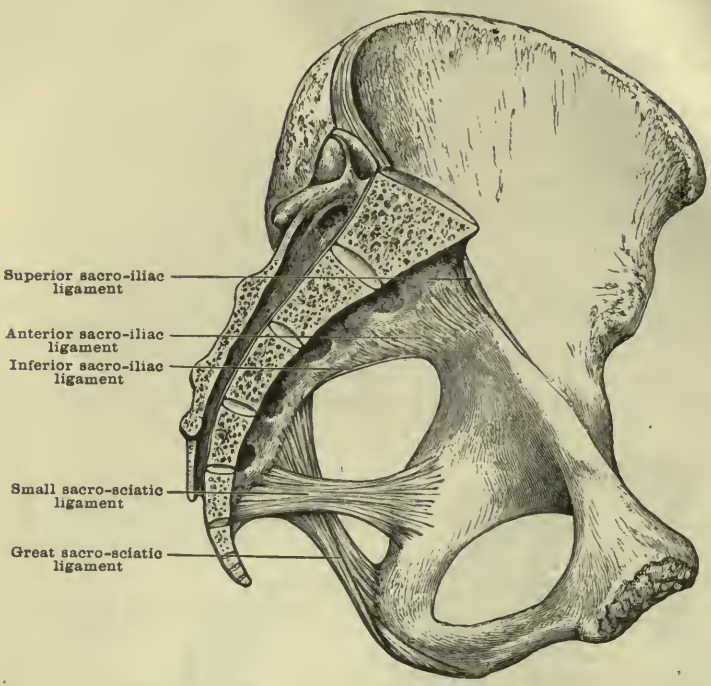


FIG. 288.—SACRO-SCIATIC LIGAMENTS. (Posterior view.) (*Morris.*)

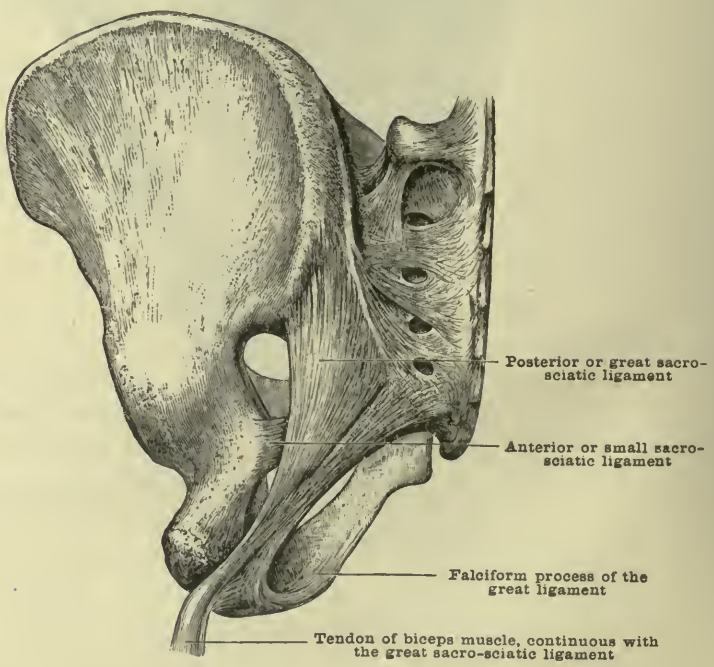
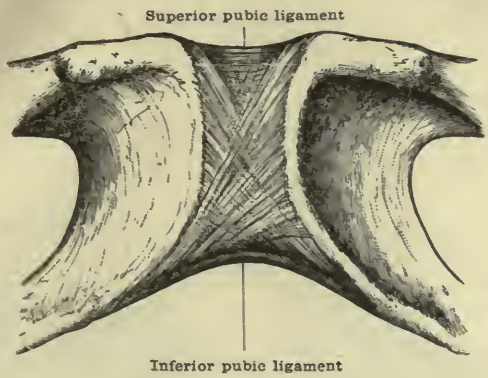

Posterior or great sacro-sciatic ligament
Anterior or small sacro-sciatic ligament
Falciform process of the great ligament
Tendon of biceps muscle, continuous with the great sacro-sciatic ligament

FIG. 289.—ANTERIOR VIEW OF THE SYMPHYSIS PUBIS (MALE), SHOWING THE DECUSSATION OF THE FIBRES OF THE ANTERIOR LIGAMENT.—(*Morris.*)



Hip-joint. Ligaments are:—

Capsular.
Ilio-femoral.
Teres.
Cotyloid.
Transverse.

FIG. 290.—ANTERIOR VIEW OF THE CAPSULE OF THE HIP-JOINT.—(*Morris.*)

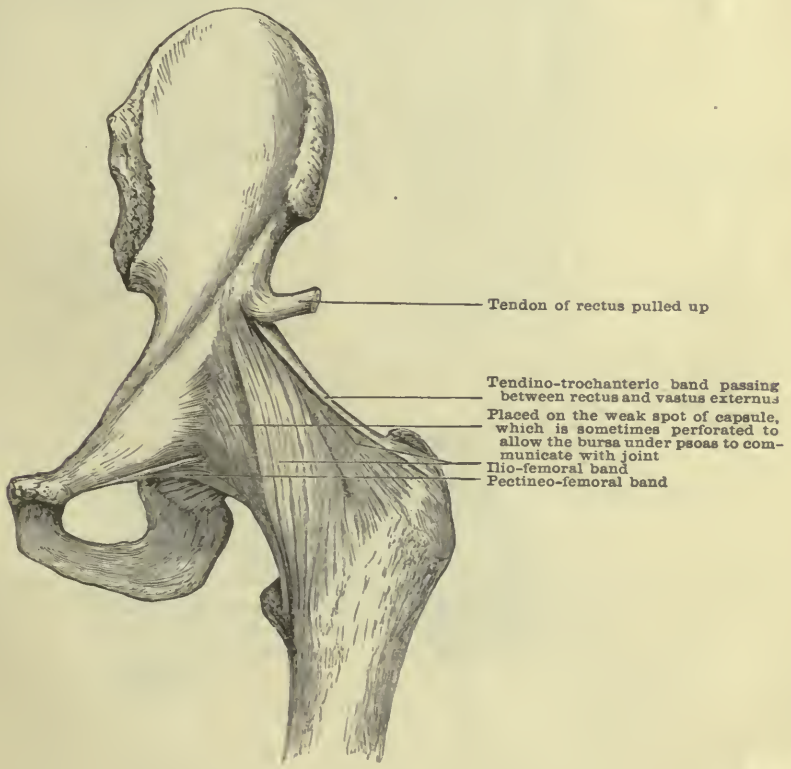

Tendon of rectus pulled up
Tendino-trochanteric band passing between rectus and vastus externus
Placed on the weak spot of capsule, which is sometimes perforated to allow the bursa under psoas to communicate with joint
Ilio-femoral band
Pectineo-femoral band

FIG. 291.—HIP-JOINT AFTER DIVIDING THE CAPSULAR LIGAMENT AND DISARTICULATING THE FEMUR.—(*Morris.*)

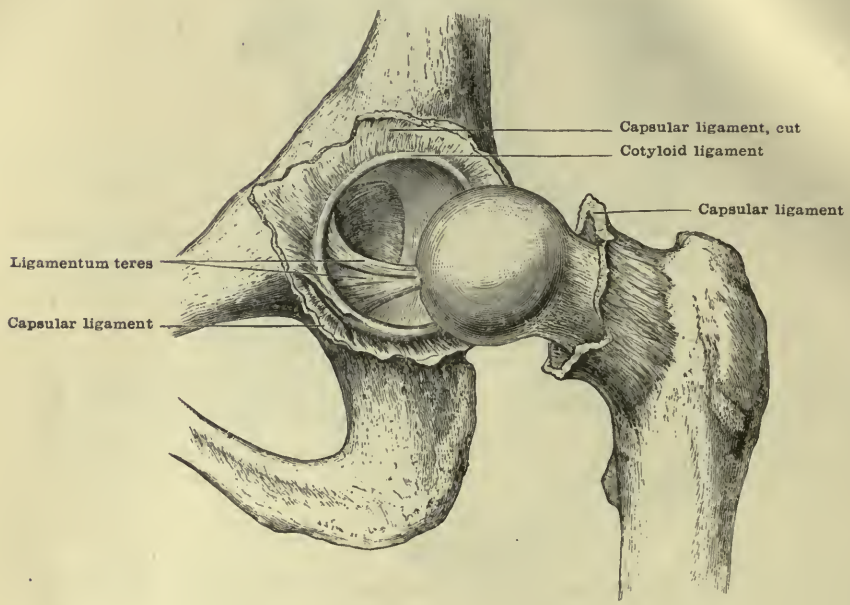
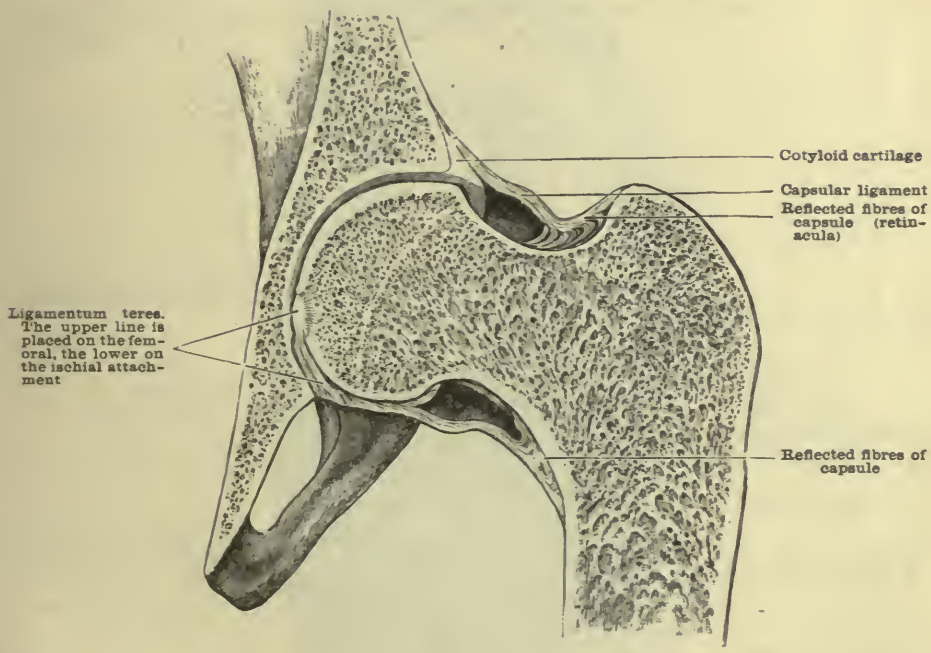


FIG. 292.—PORTIONS OF ISCHIUM AND PUBES, SHOWING THE COTYLOID NOTCH AND THE LIGAMENTUM TERES ATTACHED OUTSIDE THE ACETABULUM.—(*Morris.*)

FIG. 293.—SECTION THROUGH THE HIP-JOINT, SHOWING THE COTYLOID LIGAMENT, LIGAMENTUM TERES, AND RETINACULA.—(*Morris.*)


Cotyloid cartilage
Capsular ligament
Reflected fibres of capsule (retinacula)
Ligamentum teres. The upper line is placed on the femoral, the lower on the ischial attachment
Reflected fibres of capsule

Knee-joint.

External ligaments.
- Anterior, or ligamentum patellæ.
- Posterior.
- Internal lateral.
- Two external lateral.
- Capsular.

Interior ligaments.
- Anterior or external crucial.
- Posterior or internal crucial.
- Two semilunar fibro-cartilages.
- Transverse.
- Coronary.
- Ligamentum mucosum.
- Ligament alaria.

Processes of synovial membrane.

FIG. 294.—POSTERIOR VIEW OF THE KNEE-JOINT.—(*Morris.*)

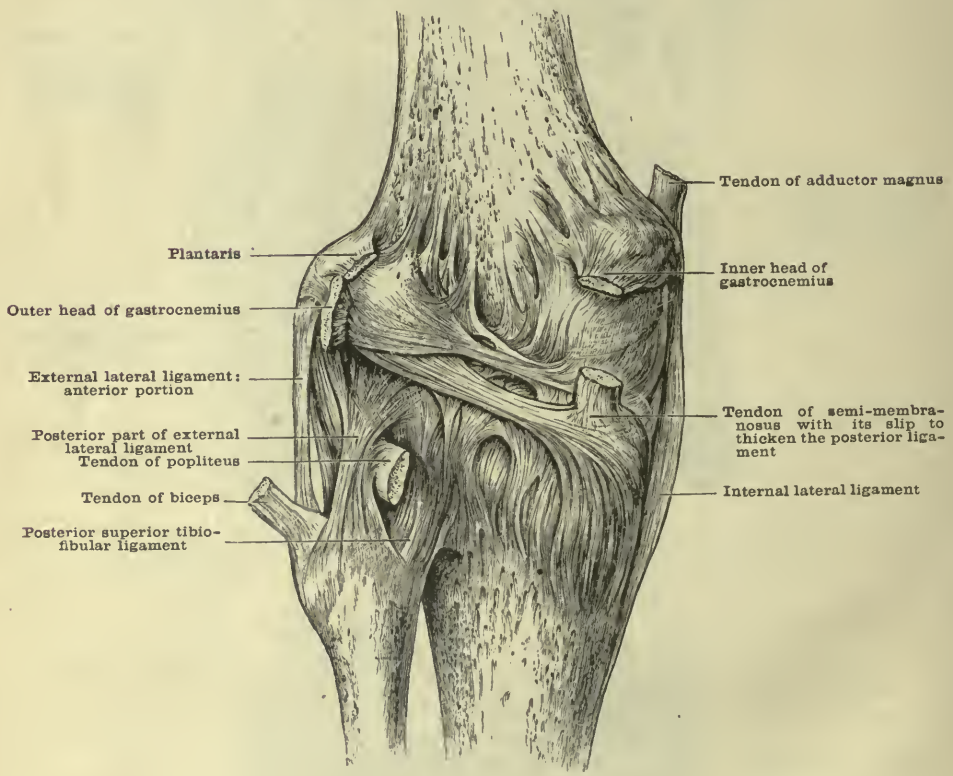

Tendon of adductor magnus
Plantaris
Inner head of gastrocnemius
Outer head of gastrocnemius
External lateral ligament: anterior portion
Tendon of semi-membranosus with its slip to thicken the posterior ligament
Posterior part of external lateral ligament
Tendon of popliteus
Internal lateral ligament
Tendon of biceps
Posterior superior tibio-fibular ligament

FIG. 295.—ANTERIOR VIEW OF THE INTERNAL LIGAMENTS OF THE KNEE-JOINT.—(*Morris.*)

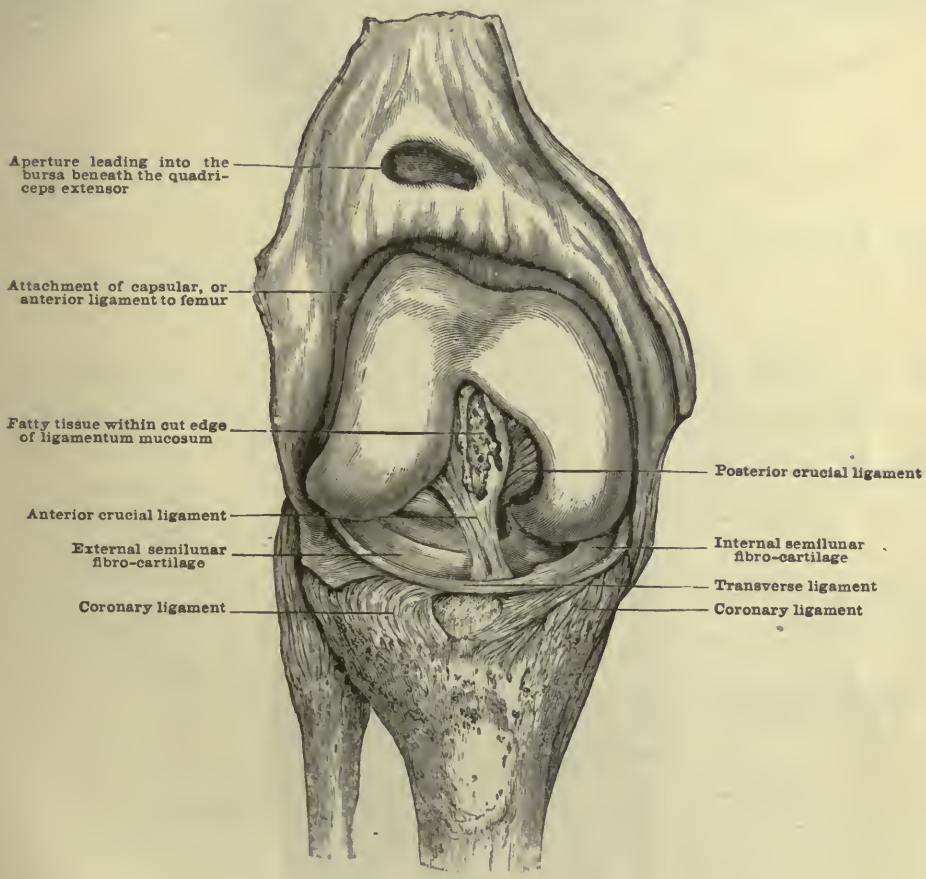

Aperture leading into the bursa beneath the quadriceps extensor
Attachment of capsular, or anterior ligament to femur
Fatty tissue within cut edge of ligamentum mucosum
Anterior crucial ligament
External semilunar fibro-cartilage
Coronary ligament
Posterior crucial ligament
Internal semilunar fibro-cartilage
Transverse ligament
Coronary ligament

FIG. 296.—STRUCTURES LYING ON THE HEAD OF THE TIBIA. (Right knee.) (*Morris.*)

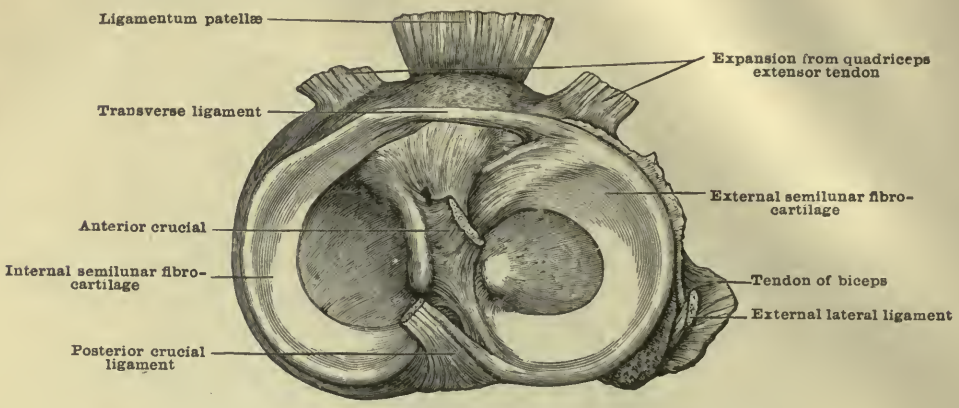


FIG. 297.—ANTERIOR VIEW OF THE KNEE-JOINT, SHOWING THE SYNOVIAL LIGAMENTS.—(*Morris.*)

(Anterior portion of capsule with the extensor tendon thrown downwards.)

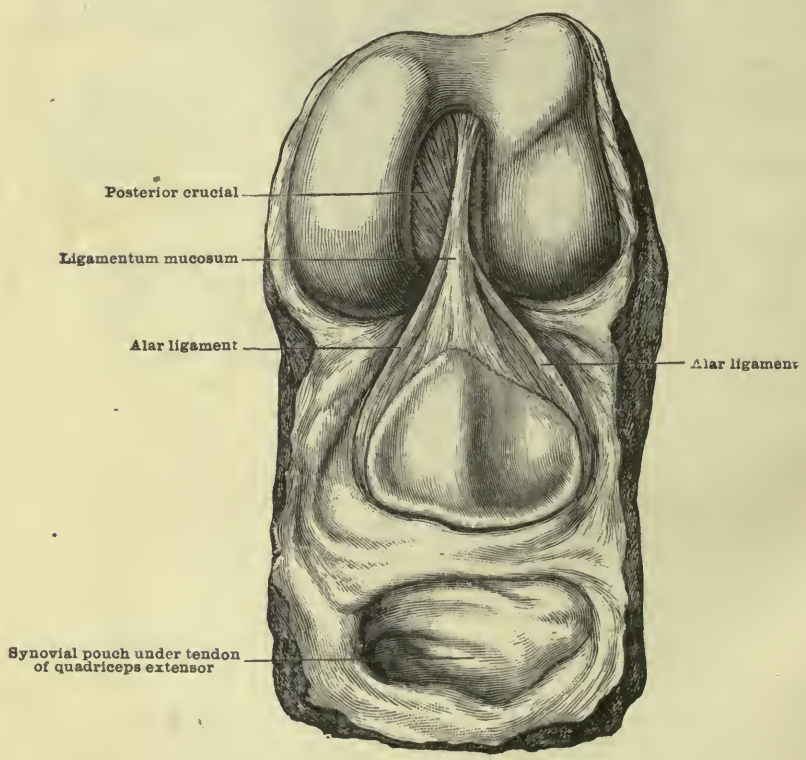


FIG. 298.—VERTICAL SECTION OF THE KNEE-JOINT IN THE ANTERO-POSTERIOR DIRECTION.—(*Morris.*)

(The bones are somewhat drawn apart.)

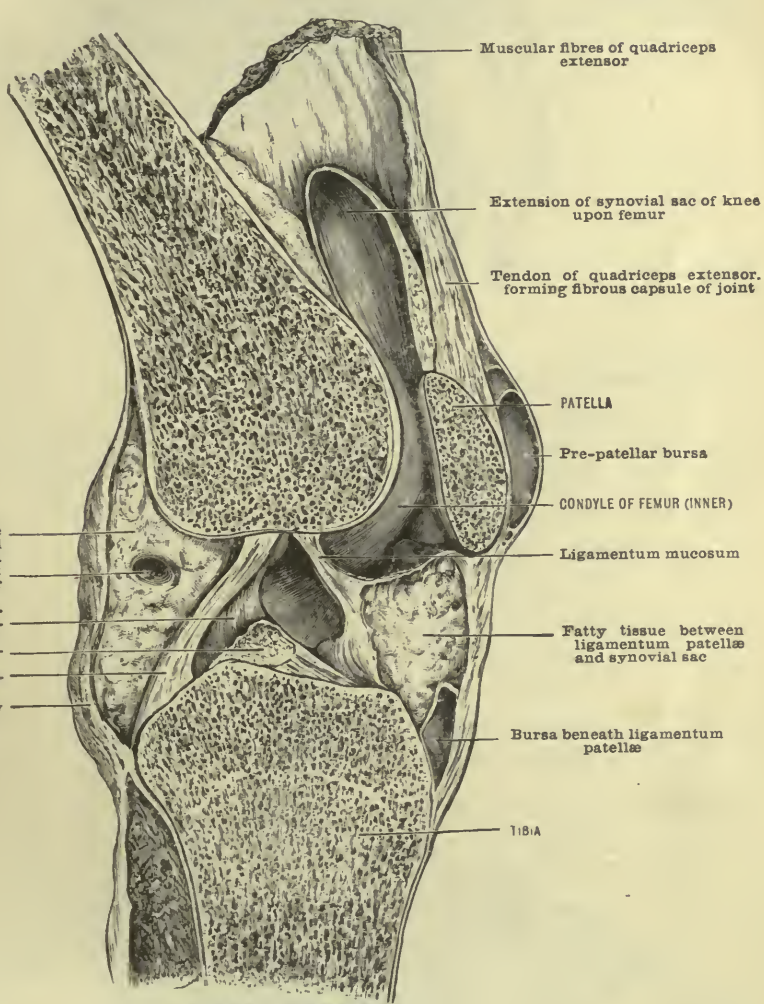
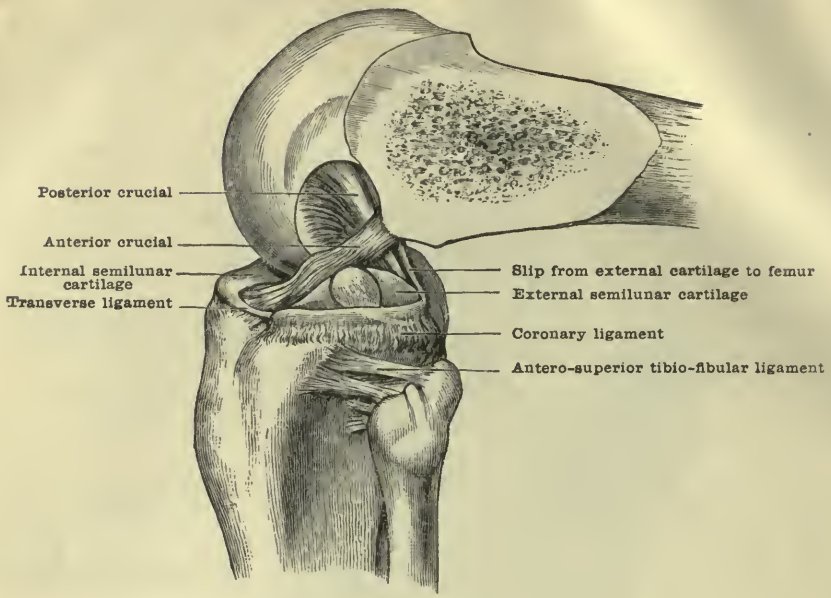

Muscular fibres of quadriceps extensor
Extension of synovial sac of knee upon femur
Tendon of quadriceps extensor, forming fibrous capsule of joint
PATELLA
Pre-patellar bursa
CONDYLE OF FEMUR (INNER)
Ligamentum mucosum
Fatty tissue between ligamentum patellæ and synovial sac
Bursa beneath ligamentum patellæ
TIBIA
Fatty tissue
Opening in synovial membrane behind crucial ligament leading into inner half of joint
Synovial membrane reflected off crucial ligaments
Cut end of anterior crucial ligament
Posterior crucial ligament
Ligament of Winslow

FIG. 299.—CRUCIAL LIGAMENTS IN FLEXION.—(*Morris.*)



Tibio-fibular union. Ligaments are:—

Superior tibio-fibular joint.
- Capsular.
- Anterior tibio-fibular.
- Posterior tibio-fibular.

Middle tibio-fibular union.
- Interosseous membrane.

Inferior tibio-fibular.
- Anterior inferior tibio-fibular.
- Posterior inferior tibio-fibular.
- Transverse.
- Inferior interosseous.

Ankle-joint. Ligaments are:—
- Anterior.
- Posterior.
- Internal lateral.
- External lateral.

COMPLIMENTS
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FIG. 300.—RIGHT ANKLE-JOINT, SHOWING THE LIGAMENTS.—(*Morris.*)
(From dissection by Mr. W. Pearson, of the Royal College of Surgeons' Museum.)

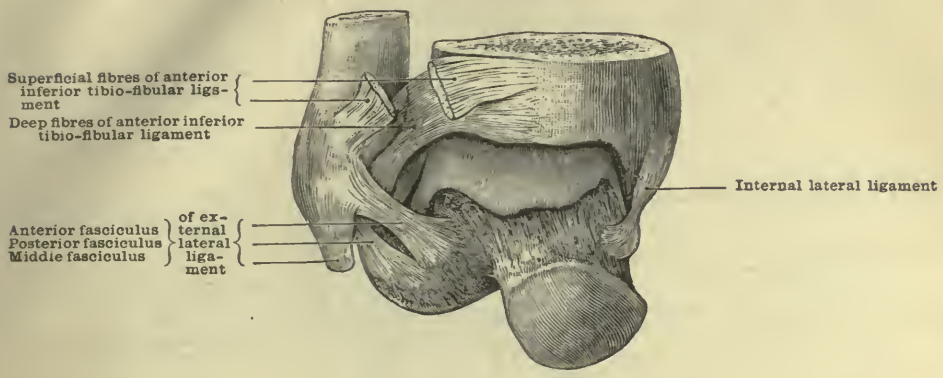


FIG. 301.—INNER VIEW OF THE ANKLE AND THE TARSUS, SHOWING THE GROOVE FOR THE TENDON OF THE TIBIALIS POSTICUS.—(*Morris.*)

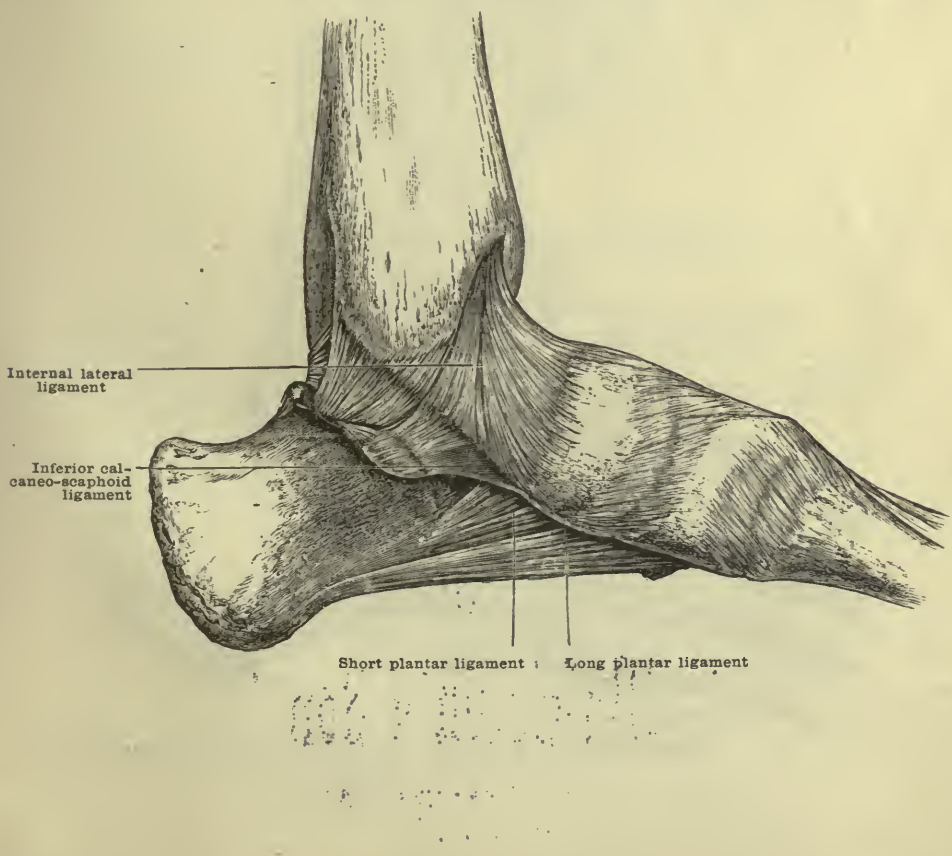


FIG. 302.—LIGAMENTS SEEN FROM THE BACK OF THE ANKLE-JOINT.—(*Morris.*)

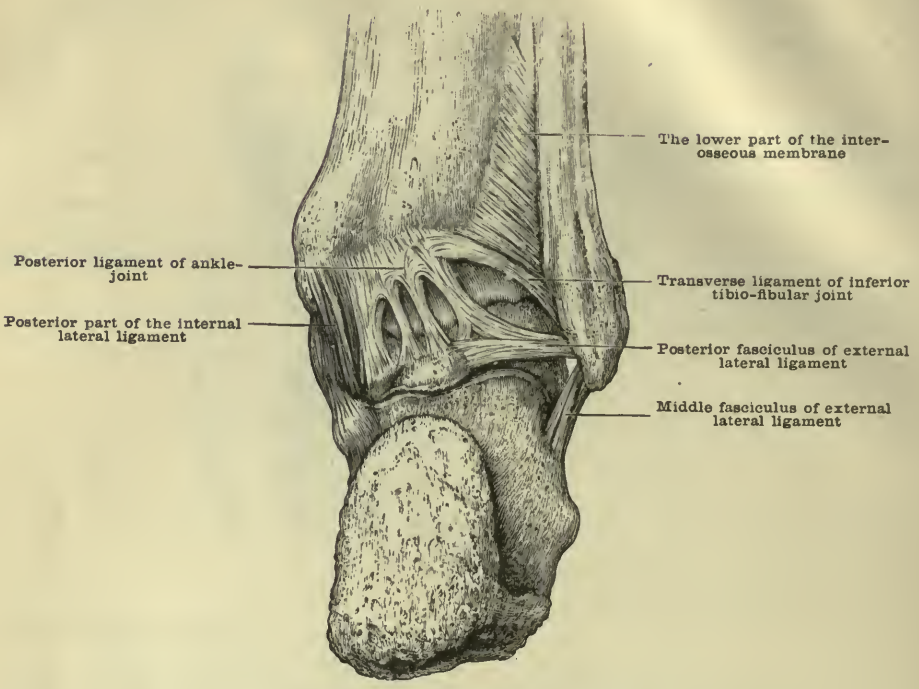
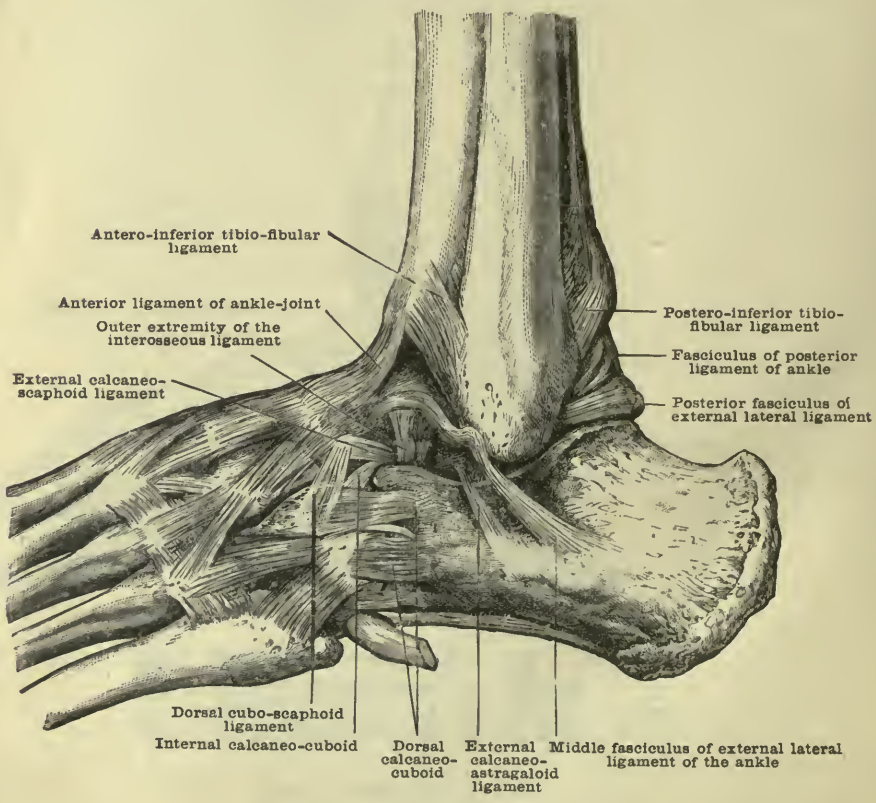

The lower part of the inter-osseous membrane
Posterior ligament of ankle-joint
Transverse ligament of inferior tibio-fibular joint
Posterior part of the internal lateral ligament
Posterior fasciculus of external lateral ligament
Middle fasciculus of external lateral ligament

FIG. 303.—EXTERNAL VIEW OF THE LIGAMENTS OF THE FOOT AND ANKLE.—(*Morris.*)


Antero-inferior tibio-fibular ligament
Anterior ligament of ankle-joint
Outer extremity of the interosseous ligament
External calcaneo-scaphoid ligament
Postero-inferior tibio-fibular ligament
Fasciculus of posterior ligament of ankle
Posterior fasciculus of external lateral ligament
Dorsal cubo-scaphoid ligament
Internal calcaneo-cuboid
Dorsal calcaneo-cuboid
External calcaneo-astragaloid ligament
Middle fasciculus of external lateral ligament of the ankle

Tarsal joints are:—

Calcaneo-astragaloid.
Anterior portion of tarsus.
Medio-tarsal.

Expose and study the ligaments of the above joints.
Clean and study the ligaments of the following joints:—
Tarso-metatarsal.
Intermetatarsal.
Metatarso-phalangeal.
Interphalangeal.
Study the blood- and nerve-supply of each joint.

FIG. 304.—VIEW OF THE FOOT FROM ABOVE, WITH THE ASTRAGALUS REMOVED TO SHOW THE INFERIOR AND EXTERNAL CALCANEO-SCAPHOID LIGAMENTS.—(*Morris.*)

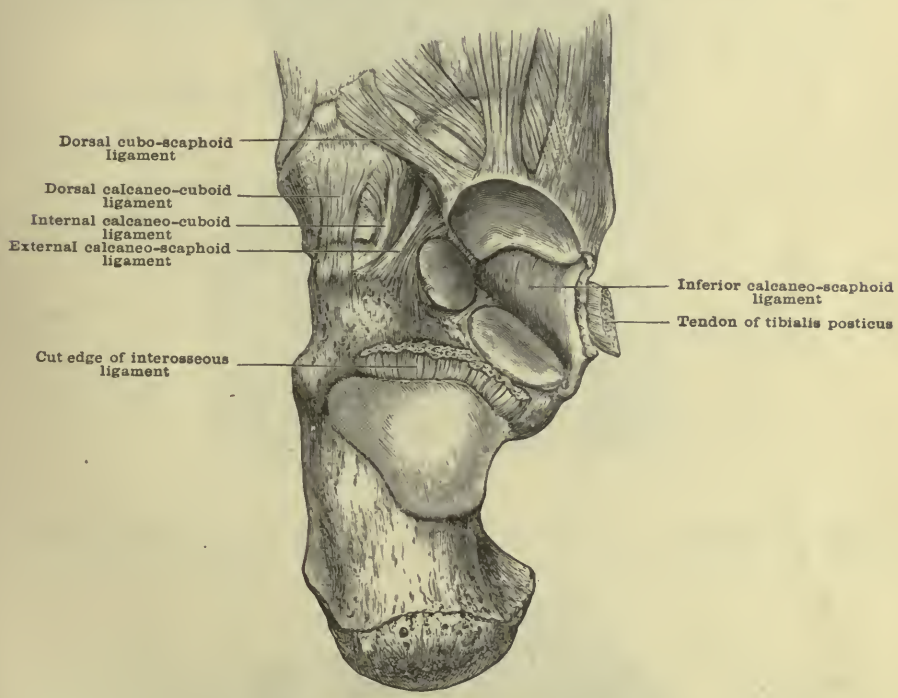


FIG. 305.—LIGAMENTS OF THE SOLE OF THE LEFT FOOT.—(*Morris.*)

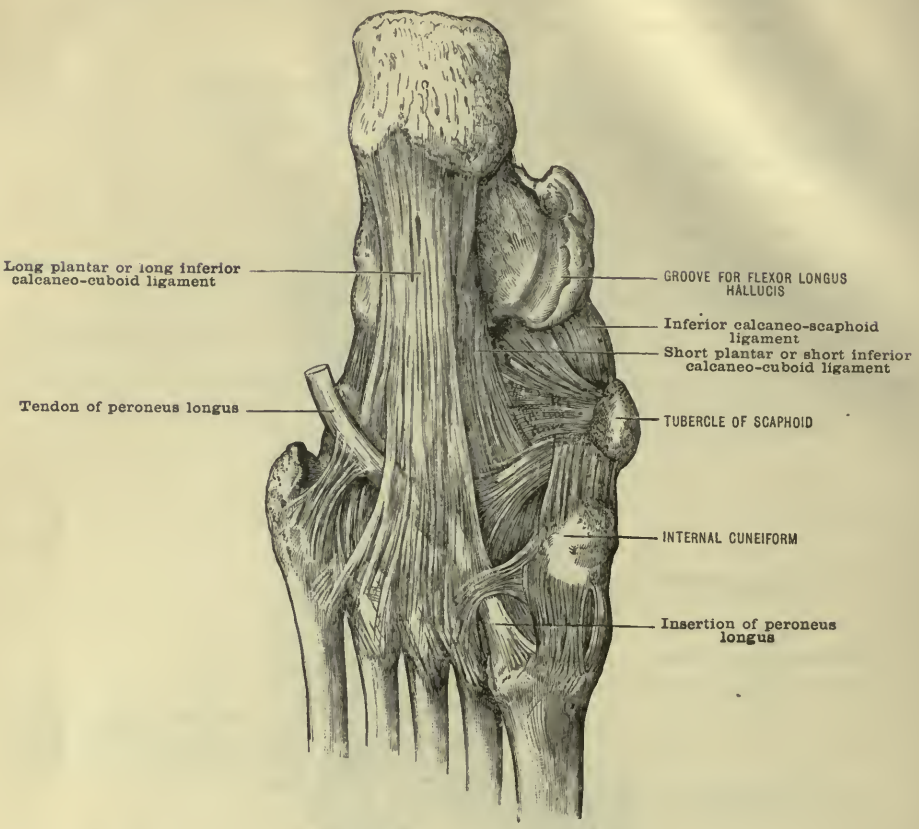
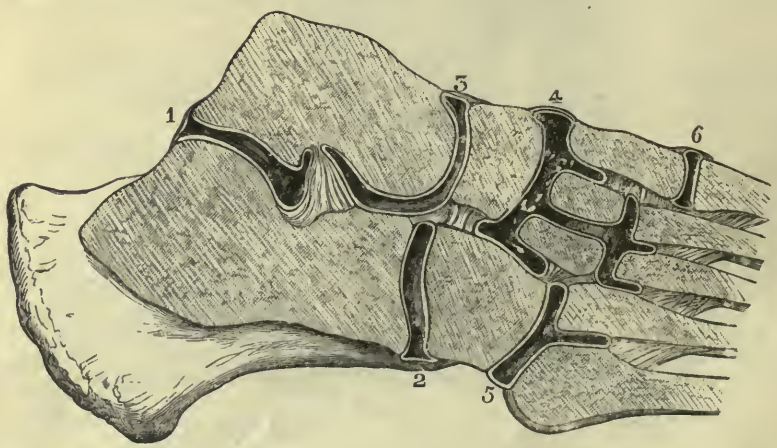

Long plantar or long inferior calcaneo-cuboid ligament
Tendon of peroneus longus
GROOVE FOR FLEXOR LONGUS HALLUCIS
Inferior calcaneo-scaphoid ligament
Short plantar or short inferior calcaneo-cuboid ligament
TUBERCLE OF SCAPHOID
INTERNAL CUNEIFORM
Insertion of peroneus longus

FIG. 306.—SECTION TO SHOW THE SYNOVIAL CAVITIES OF THE FOOT.—(*Morris.*)



1. Posterior calcaneo-astragaloid.
2. Calcaneo-cuboid.
3. Anterior calcaneo-astragalo-scaphoid.
4. Tarsal.
5. Cubo-metatarsal.
6. First metatarso-cuneiform.

The examinations of the following figures will help to understand and remember the relative positions of the structures exposed by the sections.

FIG. 307.—TRANSVERSE SECTION OF THE HIP-JOINT AND ITS RELATIONS. (One-third.) (Braune.) (*Morris.*)

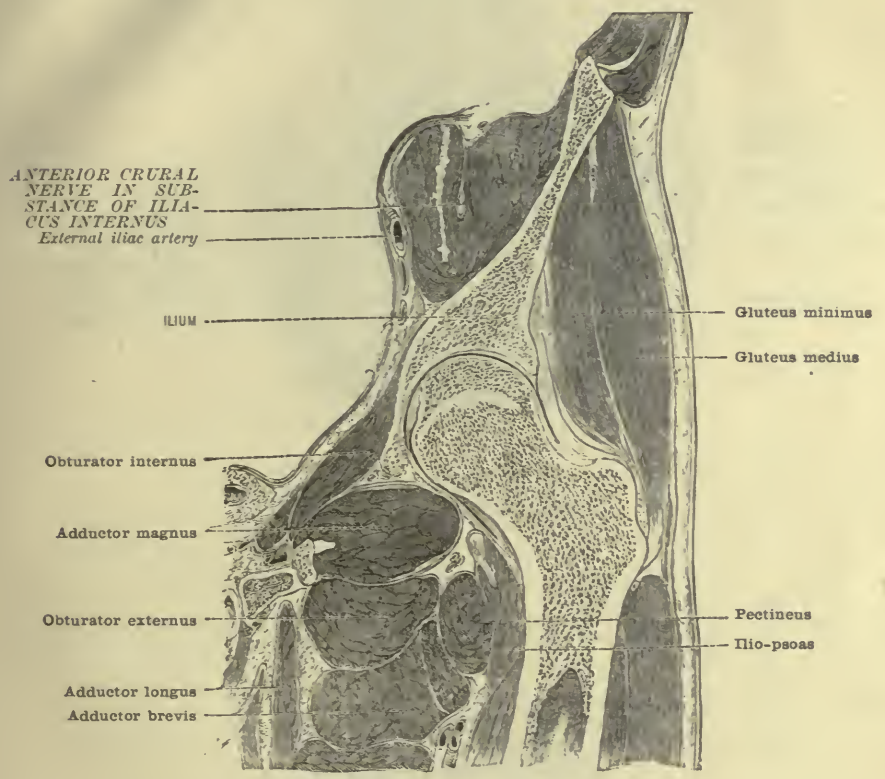


FIG. 308.—SECTION THROUGH THE HIP AND GLUTEAL REGION. (One-third.) (*Morris.*)

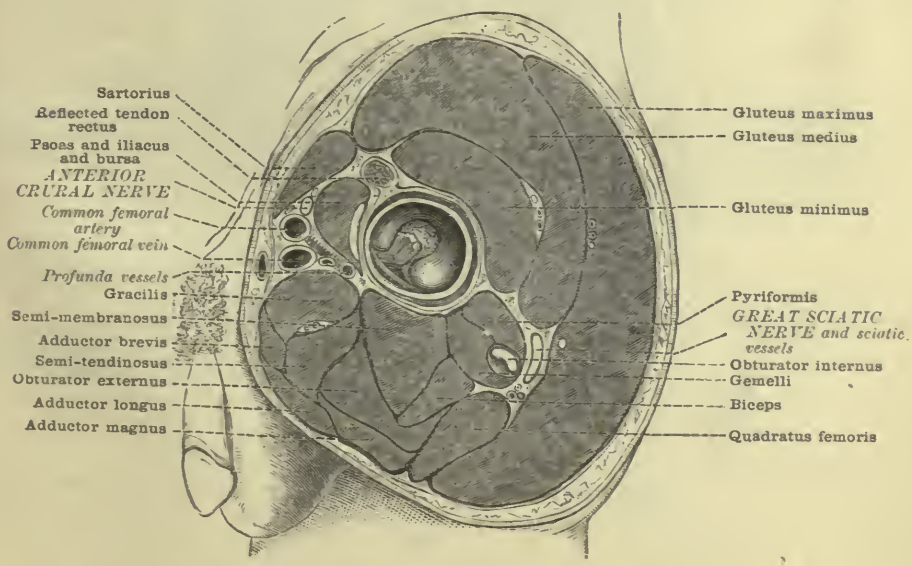


FIG. 309.—SECTION OF THE RIGHT THIGH AT THE APEX OF SCARPA'S TRIANGLE. (Heath.) (*Morris.*)

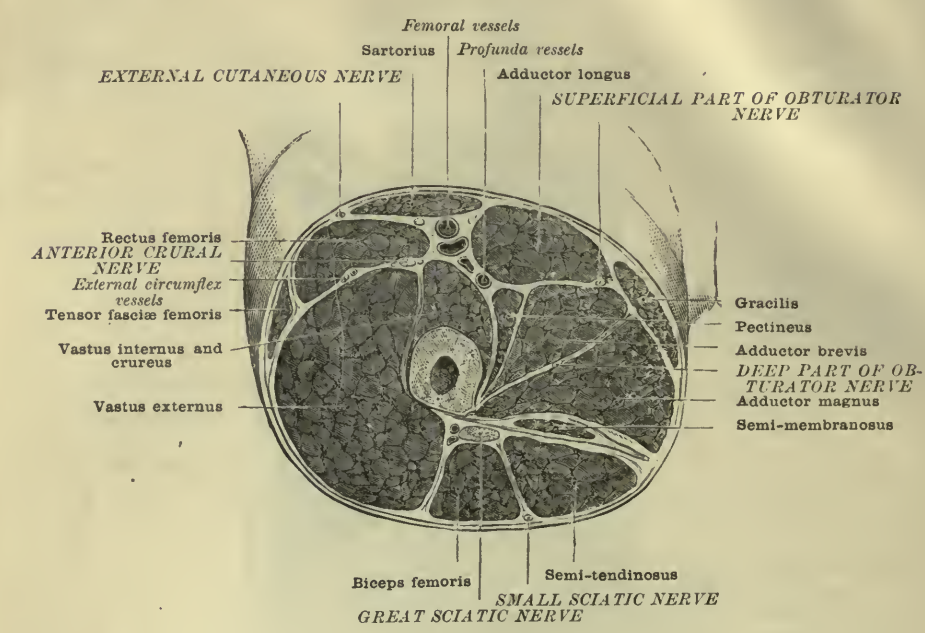


FIG. 310.—SECTION OF THIGH THROUGH UPPER PART OF HUNTER'S CANAL. (W. A.) (*Morris.*)

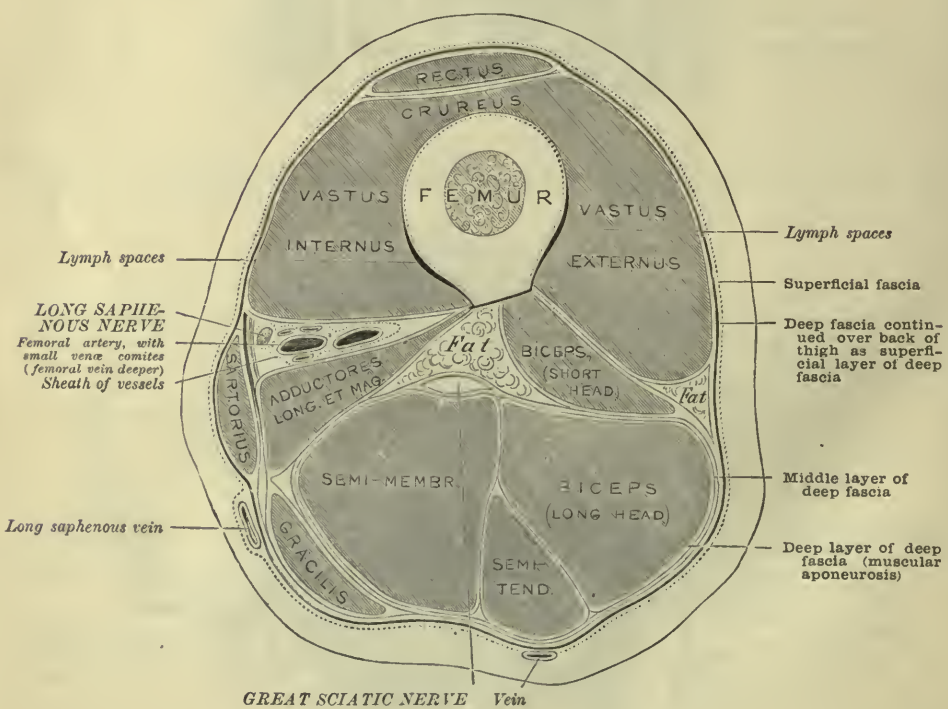


FIG. 311.—HORIZONTAL SECTION OF THE KNEE-JOINT. (One-half.) (*Morris.*)

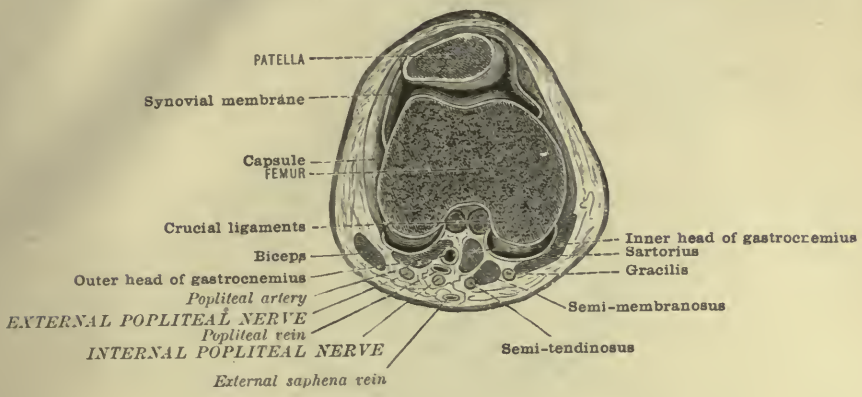


FIG. 312.—SECTION OF THE RIGHT LEG IN THE UPPER THIRD. (Heath.) (*Morris.*)

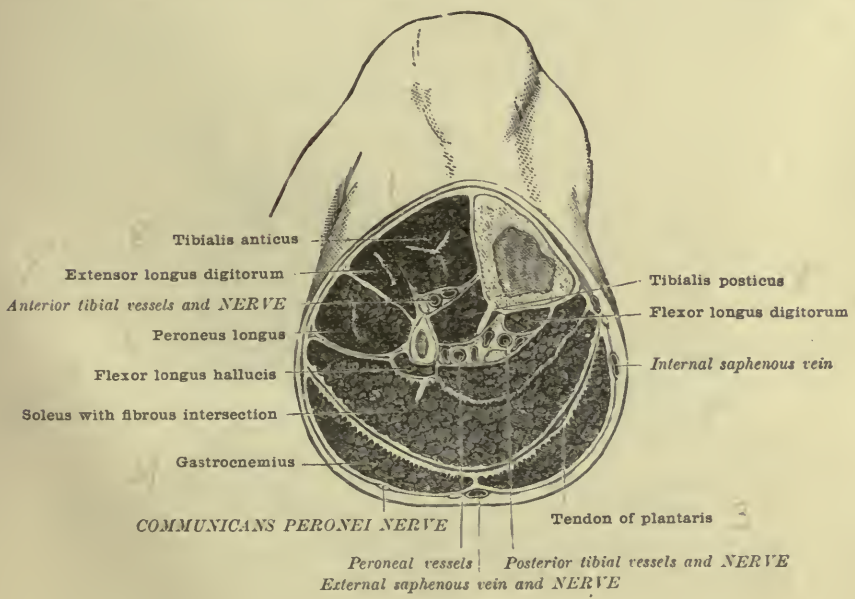


FIG. 313.—VERTICAL SECTION THROUGH THE CUNEIFORM AND CUBOID BONES. (One-half.) (*Morris.*)

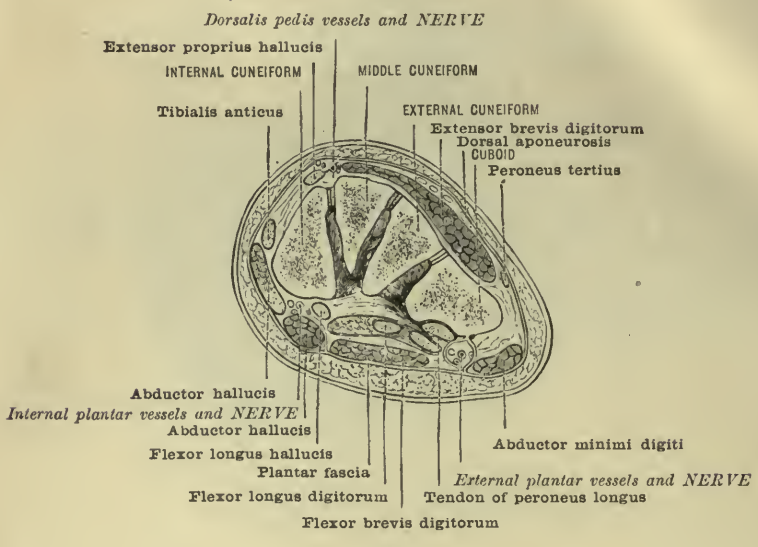
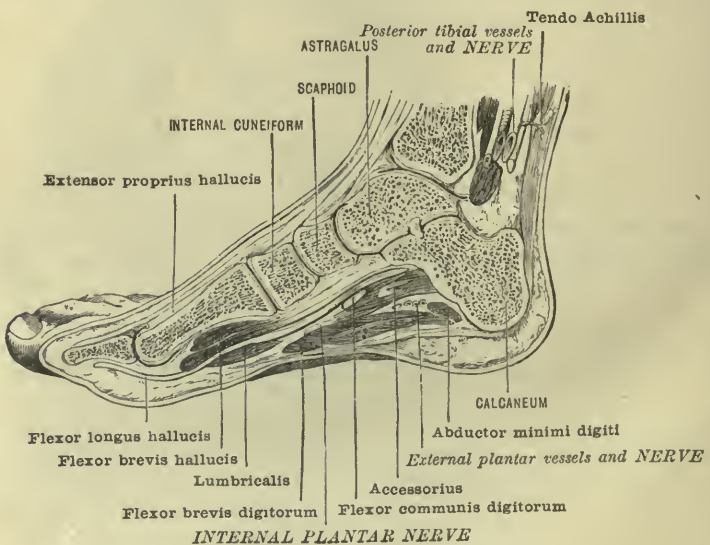


FIG. 314.—LONGITUDINAL SECTION OF FOOT. (One-third.) (Braune.) (*Morris.*)



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